Systeme Helmholz®
compatible with you

NETLink PRO Compact

Ethernet Gateway for MPI/PPI/PROFIBUS

700-884-MPI21

User Manual

Edition 2 / 16.03.2011

HW 4-1 and FW 2.35 and higher

Order number of manual: 900-884-MPI21/en

Systeme Helmholz GmbH ● Hannberger Weg 2 ● 91091 Großenseebach

Phone: +49 9135 7380-0 ● Fax: +49 9135 7380-110 ● E-Mail: info@helmholz.de ● Internet: www.helmholz.de

All rights are reserved, including those of translation, reprinting, and reproduction of this manual, or parts thereof. No part of this manual may be reproduced, processed, copied, or transmitted in any way whatsoever (photocopy, microfilm, or other method) without the express written permission of Systeme Helmholz GmbH, not even for use as training material, or using electronic systems. All rights reserved in the case of a patent grant or registration of a utility model or design.

Copyright © 2009 by

Systeme Helmholz GmbH

Hannberger Weg 2, 91091 Grossenseebach, Germany

Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at www.helmholz.de, from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

STEP ,Protool, Starter, Micromaster, and SIMATIC are registered trademarks of SIEMENS AG
MS-DOS and Windows are registered trademarks of Microsoft Corporation.

Revision history of this document:

Edition	Date	Revision
1	09.03.2010	First edition
2	16.03.2011	Change scope of delivery, Auto - (MDI)X is active, corrected a typo in address conversion table

Contents

1	**Safety Information**	**7**
1.1	General	7
1.2	Restriction of access	8
1.3	Information for the user	8
1.4	Use as intended	8
1.5	Avoiding use not as intended!	8
2	**System Overview**	**9**
2.1	Application and function description	9
3	**Installation and Mounting**	**10**
3.1	Connections	10
3.2	LED displays	10
3.3	Items supplied	11
3.4	Accessories	11
3.4.1	Manuals	11
3.4.2	Software	11
3.4.3	Other accessories	11
4	**Installation of the Driver Software**	**12**
4.1	Introduction	12
4.2	System requirements	12
4.3	Running the installation setup	12
4.3.1	Adding the interface to the PG/PC interface	13
4.3.2	Selecting the required interface parameterization	14
5	**Configuration via the NETLink-S7-NET Driver**	**15**
5.1	Bus settings	15
5.1.1	MPI	16
5.1.2	PROFIBUS configuration	17
5.1.3	PPI configuration	20
5.2	Local connection (TCP parameterization)	20
5.2.1	Creating a station	21
5.2.2	Setting TCP parameters	23
5.2.3	Operation without the DHCP	24
5.2.4	DHCP	25
5.2.5	Additional features	25

5.3	Options of the driver	26
5.3.1	Language setting of the display elements	26
5.3.2	Version information	27
5.4	Diagnostics	27
5.4.1	Bus nodes	27
5.4.2	Bus parameters	27
5.5	Teleservice	28
6	**The Tool: '*NETLink® PRO Family Configuration*'**	**29**
7	**Possibilities of the Web Interface**	**30**
7.1	Home page	30
7.2	Status page	31
7.3	Configuration page	35
7.4	Security page	38
7.5	Observing variables	40
8	**RFC1006 Function (S7-TCP/IP)**	**43**
9	**Bus Parameters in Single Master Operation**	**44**
9.1	Storing specified bus parameters	44
9.2	Addressing (rack/slot mode ON/OFF)	45
9.2.1	Addressed mode	46
9.2.2	Rack/slot mode	46
9.3	Example of configuration for WinCC V7.0	47
9.3.1	Using addressed mode	47
9.3.2	Use of rack/slot mode	50
10	**Troubleshooting**	**54**
11	**Appendix**	**59**
11.1	Technical data	59
11.2	Pin assignments	59
11.2.1	MPI/PROFIBUS interface pin assignments	59
11.2.2	Assignment of the Ethernet interface (host interface)	60
11.2.3	Power supply socket	60
11.3	Further documentation	60
11.3.1	Information in the internet	60
11.3.2	Address conversion table	61
12	**Glossary**	**62**

1 Safety Information

For your own safety and for the safety of others, always heed the safety information given here. The safety information indicates possible hazards and provides information about how you can avoid hazardous situations.

The following symbols are used in this manual.

Caution, indicates hazards and sources of error

Gives information

Hazard, general or specific

*Danger of **electric shock***

1.1 General

The NETLink® PRO Compact is only used as part of a complete system.

The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.

During configuration, safety and accident prevention rules specific to the application must be observed.

Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.

Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk assessment).

Never execute or initiate safety-related functions using an operator terminal.

1.2 Restriction of access

Only authorized persons must have access to the modules!

The modules are open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization.

1.3 Information for the user

During configuration, safety and accident prevention rules specific to the application must be observed.

This manual is addressed to anyone wishing to configure, use, or install the NETLink® PRO Compact.

The manual tells the user how to operate the NETLink® PRO Compact and explains the signaling functions. It provides the installing technician with all the necessary data.

The NETLink® PRO Compact is exclusively for use with a S7-200 and S7-300/S7-400 programmable controller from Siemens.

The NETLink® PRO Compact is for use within a complete system only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

1.4 Use as intended

The NETLink® PRO Compact must only be used as a communication and signaling system as described in the manual.

1.5 Avoiding use not as intended!

Make sure in the software that uncontrolled restarts cannot occur.

Safety-related functions must not be controlled via the NETLink® PRO Compact alone. Make sure in the software that uncontrolled restarts cannot occur.

2 System Overview

2.1 Application and function description

The NETLink® PRO Compact is a gateway between a TCP network and a MPI, PPI, or PROFIBUS network.

Two protocols are available at the TCP end for exchange of useful data with the automation system (multi-protocol operation):

- One is a proprietary protocol that is used to connect to the proprietary NETLink-S7-NET driver
- The other is the S7-TCP/IP protocol often used by visualization system manufacturers which is known as *'RFC1006'* or *'ISO on top of TCP.'*

Up to 16 TCP connections (10 Mbps, 100 Mbps) and up to 32 MPI/PPI/PROFIBUS connections (9.6 kbps to 12 Mbps) can be used simultaneously.

The NETLink® PRO Compact has the shape of a PROFIBUS connector with a PG female connector and it is plugged directly into the MPI/PPI/PROFIBUS interface of the automation system. Because it is active, no spur line is created that could interfere with the bus. The TCP/IP end of the NETLink® PRO Compact is electrically isolated from the MPI/PPI/PROFIBUS.

On both the TCP and the field bus sides, the baud rate used can be determined automatically (auto negotiation or auto baud)

The NETLink® PRO Compact can draw the necessary power supply either from the bus interface of the programmable controller or via an external power supply.

The use of the NETLink-S7-NET driver makes it possible to use the NETLink® PRO Compact as the following at the PC end

- Programming adapter,
- Teleservice unit, or
- Operator control and monitoring unit

The RFC1006 interface also enables you to use third-party software that supports this protocol to communicate with S7-200/S7-300 and S7-400 systems.

The NETLink® PRO Compact can generally be connected to the PC via a switch, hub or directly via LAN cable.

3 Installation and Mounting

Before you start installation work, all system components must be disconnected from their power source.

Installation must be effected in compliance with VDE 0100 / IEC 364. The NETLink® PRO Compact has degree of protection IP20. Please ensure a maximum ambient temperature of 60 °C for reliable operation.

The NETLink® PRO Compact is plugged directly into the SUB D female connector of the PROFIBUS station instead of the standard PROFIBUS device connector. It is fixed using the permanently integrated hexagon-head housing screws and therefore makes permanent contact.
Further bus nodes for diagnostic devices can be connected to the integrated PG female connector.

Only CAT5-TCP cables with an RJ45 connector can be connected to the NETLink® PRO Compact housing. No further outlets, for example, PROFIBUS cable, can be installed on the device. Therefore no termination is possible on the connector housing and the "ON/OFF" switch for this is not been incorporated.

3.1 Connections

The NETLink® PRO Compact has the following connections:

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

- RJ45 socket for connecting the supplied standard CAT5-TCP cross-over cable. The automatic interface detection “Auto - (MDI)X” means that switches and computer direct connections can be used with this cable type. A separate converter is not required.
- Bus connector with PG female connector. This enables further bus nodes to be plugged in.
  The NETLink® PRO Compact is an ‘active cable.’ This means there is no spur line, which avoids interference with high baud rates.
- Power supply socket for 24 V DC power supply.
  This power supply option can be used, if the programmable controller used does not provide any or only insufficient power on the bus connector.

3.2 LED displays

For display of the operating state, the NETLink® PRO Compact has two multi-colored LEDs.

These are located on the front of the housing behind a white inspection window.

LED status for operating status	Power LED (blue)	Bus LED (orange)	Active LED (green)	Bus LED (red)
Ready for operation	ON			
Try to log on to the MPI/PPI/PROFIBUS	ON	BLINK		
Actively logged on to the MPI/PPI/PROFIBUS	ON		ON	
Data exchange with a programmable controller	ON		BLINK	
Transferring firmware update	ON			BLINK

The status of the two LEDs located on the RJ45 socket indicates the state of the LAN that is connected to the NETLink® PRO Compact:

LINK LED (green)		ACTIVE LED (yellow)	
Status	**Description**	**Status**	**Description**
OFF	Not connected	**OFF**	No activity on the network
ON	Connected	**ON**	Activity on the network
BLINK		**BLINK**	Activity on the network

3.3 Items supplied

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

The scope of supply of the NETLink® PRO Compact includes:

- NETLink® PRO Compact ready for operation
- CAT5 TCP cable (cross-over) with a length of 3 meters
- CD with NETLink-S7-NET driver, additional info
- Quick Start Guide (German/English)

3.4 Accessories

3.4.1 Manuals

Manual, German	900-884-MPI21/en
Manual, English	900-884-MPI21/en

3.4.2 Software

S7/S5 OPC server with USB dongle	800-880-OPC20

3.4.3 Other accessories

Power supply adapter with plug	700-751-SNT01
Input: 100-240 V AC / 47-63 Hz / 400 mA	
Output: 24 V DC / 625 mA	

4 Installation of the Driver Software

With installation of the NETLink-S7-NET driver for the NETLink® PRO Compact, it is easy to access controllers with an MPI-, PPI- or PROFIBUS interface from the PG/PC via TCP/IP.

4.1 Introduction

The NETLink-S7-NET driver is inserted in the PG/PC interface of an existing Simatic application and can then be used from most Simatic engineering tools (STEP7, ProTool, WinCC, etc.).

As a result, access is possible to any controllers of the Simatic S7-200, S7-300, or S7-400 series via the NETLink® PRO Compact.

4.2 System requirements

A PC with a 32-bit Windows operating system is required to operate the NETLink-S7-NET driver at the PU end. The XP operating systems (SP3 and higher) and Windows Vista operating systems can be used.

A further requirement is the existence of Simatic engineering tools, such as STEP7, Version 5.1 and higher or STEP7-Micro/Win Version 4.0 and higher, which ensures that the PG/PC interface is installed on the computer.

Installation under Windows 98/ME/NT is possible but is not supported by the technical support team of Systeme Helmholz GmbH. Please pay attention to the requirements of the Simatic package used.

A functioning network link using TCP/IP must have been set up on the PG/PCs that are used. The network configuration of the PC must be known. Commercially available network cards and, for the connection, cross-over or 1:1 (straight) cables may be used.

The integrated auto-negotiation function automatically negotiates the TCP/IP transmission speed between the stations. In this way, the best performance is achieved in a local 100 Mbps network. Status operation will be slowed down if older 10 Mbps network cards and hubs are used.

4.3 Running the installation setup

After you have inserted the installation CD, user guidance starts automatically, allowing the user to start the setup routine of the NETLink-S7-NET driver.

If the user guidance does not start automatically, the setup file can be launched manually in directory '*CD drive:\Driver*.'

If necessary, you can download the latest NETLink-S7-NET driver from our homepage (http://www.helmholz.de).

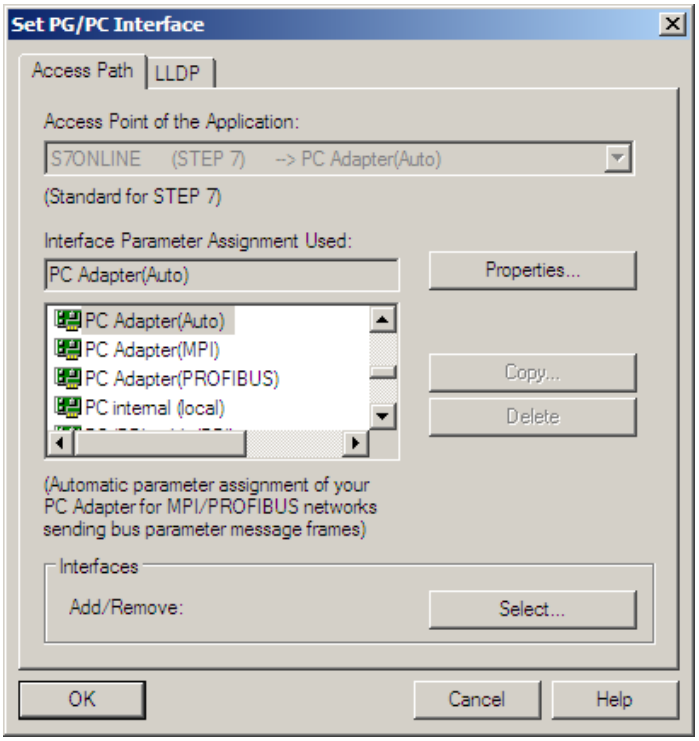
Administration rights are required for installation.

Please note that for installation you have to log on as an administrator under the 32-bit Windows operating systems Windows 2000® and Windows XP® because the setup program has to make entries in the Windows registry.

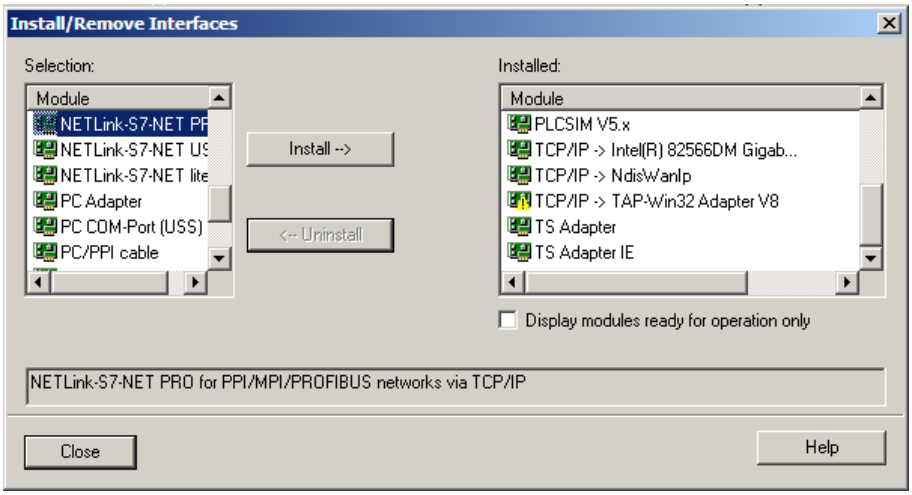
4.3.1 Adding the interface to the PG/PC interface

After initial installation, the new interface parameter set '*NETLink-S7-NET PRO*' has to be set up. Administrator rights are necessary for this.

After you have started '*Set PG/PC Interface*' in the Control Panel, click the '*Select...*' button there.

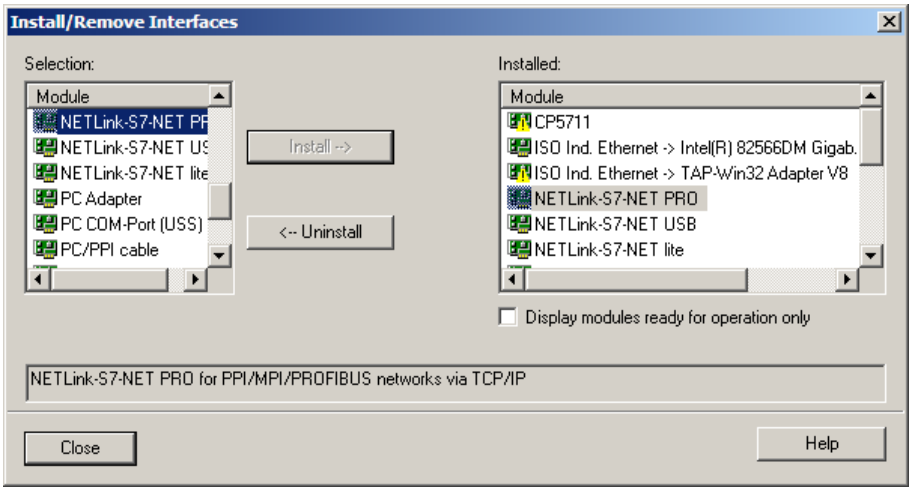


This opens the '*Install/uninstall interface*' dialog box.



After you have selected the entry '*NETLink-S7-NET PRO family*' from the left-hand list, click the '*Install-->*' button.

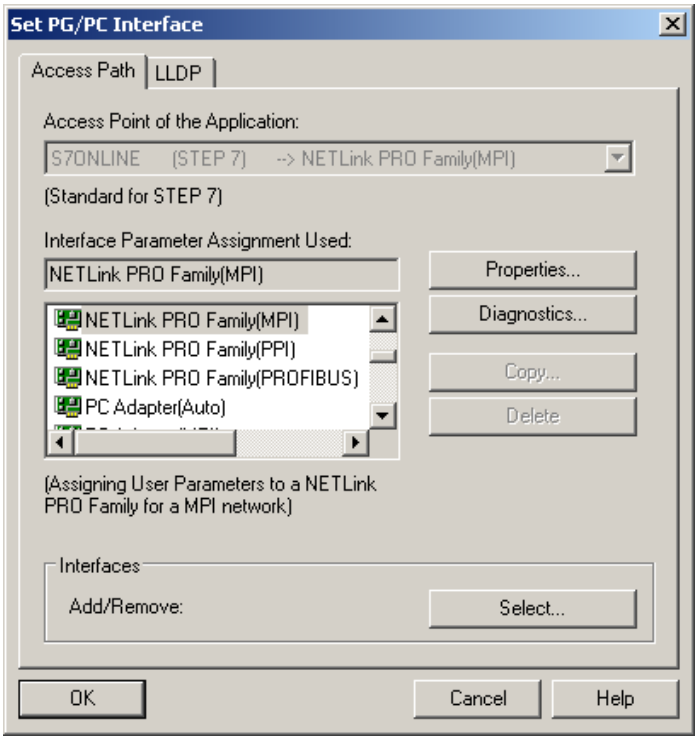
The *'NETLink-S7-NET PRO'* has now been included in the selection list so that it is available for selection in future.



The access path in the *'Set PG/PC Interface'* dialog box is set when this window is closed.

4.3.2 Selecting the required interface parameterization

The selection list for the interface parameter sets now contains an additional three items for the NETLink® PRO Family.



All relevant settings of a NETLink-S7-NET driver can be made via the *'Properties'* access field. With the button *'Diagnostics...,'* it is possible to show the nodes connected to the bus and the parameters the bus is working with. These fields are explained in Section 5.

5 Configuration via the NETLink-S7-NET Driver

Once a NETLink® PRO Family has been selected in the '*Set PG/PC Interface*' window, it is possible to specify this access path more precisely with the '*Properties…'* button.

With the functionality behind the button '*Diagnostics...,'* which is visible when a NETLink® PRO Family is selected, it is possible to read the bus configuration and scan connected nodes.

The properties of the access NETLink® PRO Family are divided into three subareas:

- Bus settings
  Here it is possible to state the bus configuration (e.g. station address) with which the NETLink® PRO Compact will enter the bus system (Section 5.1).
- Local connection (TCP configuration)
  Here, you set the IP address via which the required connection with the programmable controller will be established (Section 5.2).
  The NETLink® PRO Compact hardware can also be parameterized in this window.
- Options
  Here it is possible to change the language of the NETLink-S7-NET driver and to read out the version information of the driver (Section 5.3).

Two functionalities are implemented for diagnostics at the connected bus:

- Bus members
  a list of all active and passive nodes connected to the bus will be displayed. By request the order numbers (MLFBs) will be displayed also if this functionality is available by the nodes (Section 5.4.1).
- Bus parameters
  If possible, a list of all available bus parameters will be displayed (Section 5.4.2).

5.1 Bus settings

The NETLink® PRO Compact can be operated on three different bus systems: MPI, PPI, and PROFIBUS.

From the NETLink® PRO Compact user's viewpoint, the three bus systems only differentiates by the transmission rates that can be selected and the additional options which are explained here.

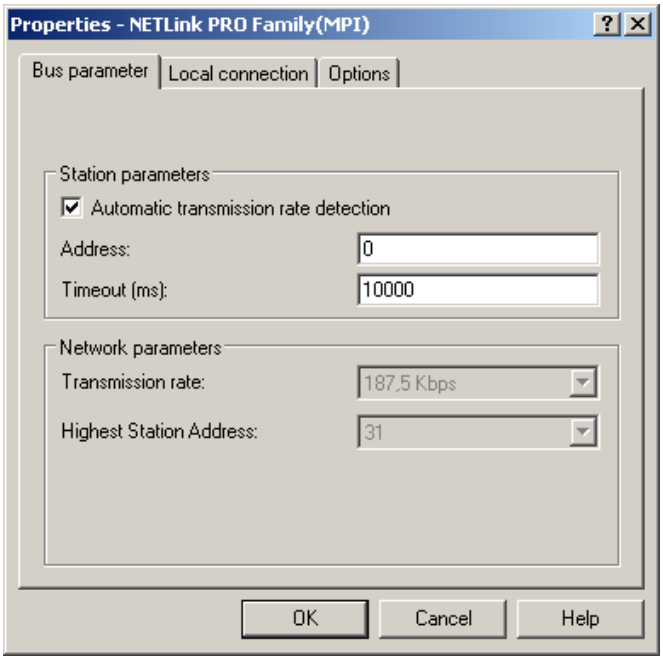
The bus configuration is passed to the NETLink® PRO Compact during the runtime of the NETLink-S7-NET driver and is not stored in the device.

It is possible to use the NETLink® PRO Compact without specifying bus-related information. The NETLink® PRO Compact then automatically ascertains the baud rate and the bus parameters,

and can be operated on different programmable controllers with different transmission rates without switching over the NETLink-S7-NET driver.

5.1.1 MPI

The MPI configuration contains station and network-related settings.



The most important setting concerning bus configuration is assignment of the station address. This refers to the address the NETLink® PRO Compact will have on the bus when it goes online.

The station address can have any value from *'0'* and *'126'* if the selected address is lower than or equal to the highest station address (HSA).

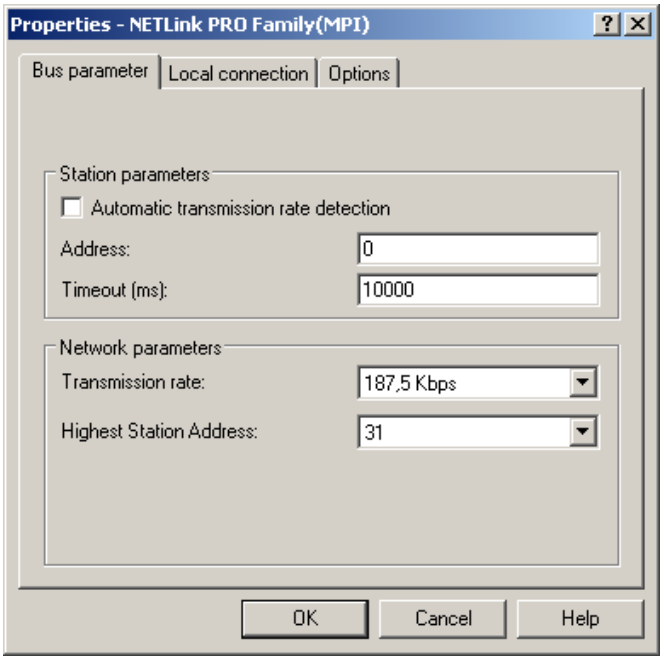
Example: HSA = 31

Any value between *'0'* and *'31'* can be specified for the station address if this address does not yet exist on the bus.

The local timeout of the NETLink-S7-NET driver can be parameterized in the station-related settings. If the driver does not receive a response to a request within the set timeout, a communication error is signaled to the Simatic application.

The network settings can be adapted manually if the checkmark next to "*Automatic Baud Rate Detection*" is removed. This is usually only necessary if the NETLink® PRO Compact fails to sign onto the bus system automatically (can happen with passive bus nodes).

Some older Siemens CPUs do not support the auto baud function on the MPI. PPI systems do not usually support this function either. In such cases, the network-related parameters should be adapted manually.



The transmission speed and the HSA of the PLC being addressed must be known and identical to all connected bus nodes.

It is also possible that the auto baud function may not function reliably at transmission rates slower than or equal to 19.2 Kbps or with increased use of communication via global data exchange, because the relevant frame is transmitted more irregularly by the CPUs. In such cases it may be advantageous to assign the bus parameters manually.

5.1.2 PROFIBUS configuration

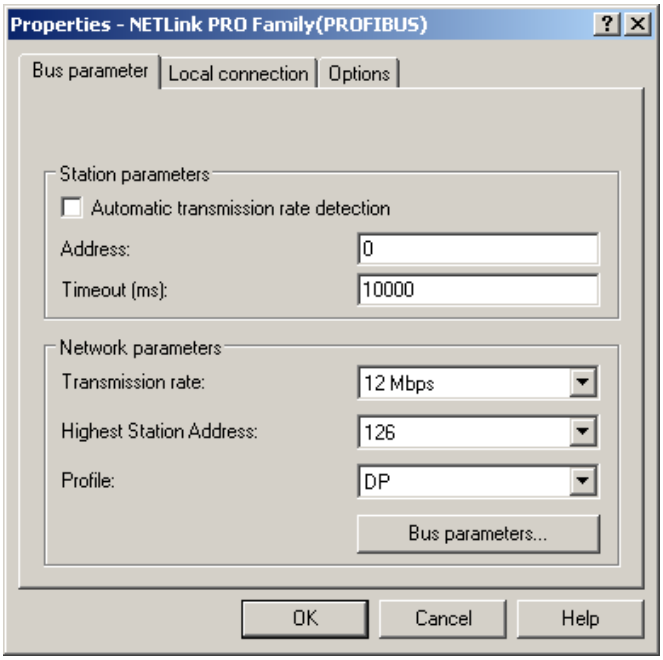
Basically, the same applies to PROFIBUS configuration as to MPI configuration. However, the network-related parameters are more extensive.

In addition to the parameters transmission rate and highest station address mentioned in Section 5.1.1, PROFIBUS also has parameter field for selecting the bus profile and bus parameters.

If the NETLink® PRO Compact is the only active station on the PROFIBUS, it operates in so-called single-master mode, i.e. it generates the token cycle with the set bus parameters.

If the bus speed on the PROFIBUS is set to a value less than 187.5 Kbps, please remember that it may take up to half a minute for the bus parameters to be recognized.

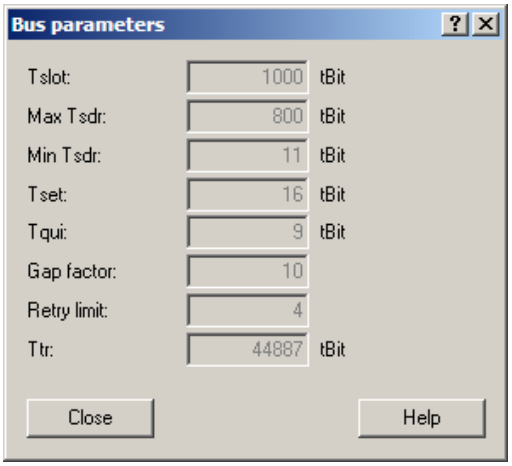
In this case, the timeout value should be increased correspondingly.



Profile:

- Under PROFIBUS, there are usually the profiles *DP*, *Standard* und *User defined*.
- The profile must be selected that is already used in the programmable controller.

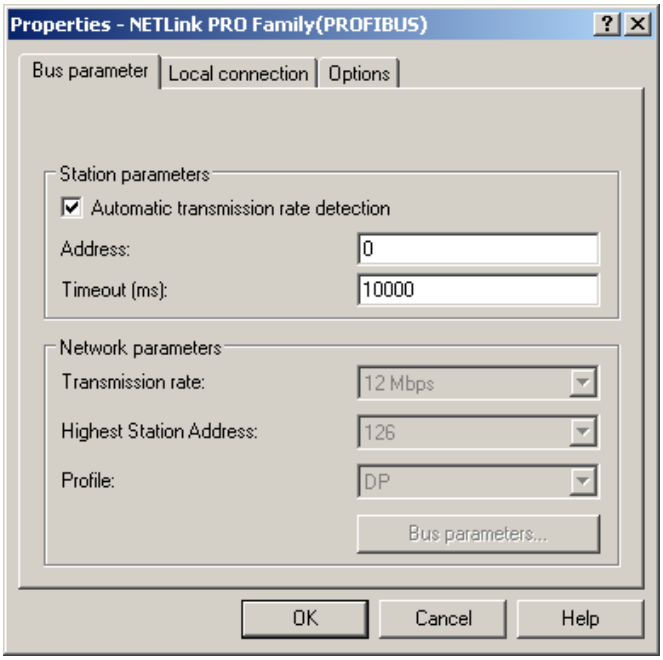
Bus parameters:



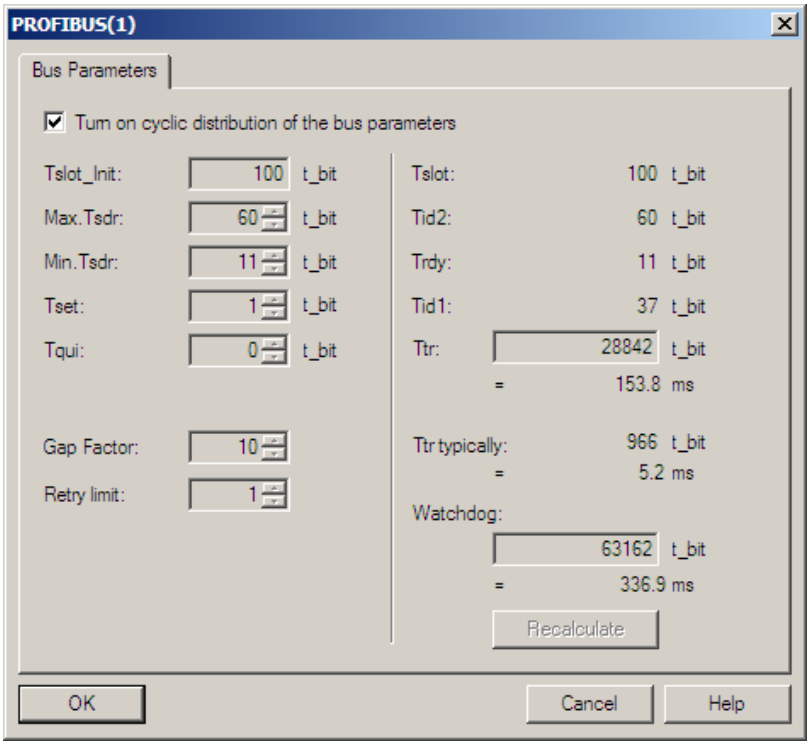
- Unlike the MPI bus profile, the bus parameters for PROFIBUS are not constant and change with the type and number of PROFIBUS stations used.
- Always set the PROFIBUS parameters that are set in the currently used programmable controller (see current STEP7 project).

In order to simplify these procedures, it makes sense to use of the auto baud function under PROFIBUS.

The bus parameters are then calculated automatically.



Under PROFIBUS, please note that the auto baud function works best if the *'Cyclic distribution of the bus parameters'* function is activated in the programmable controller used.



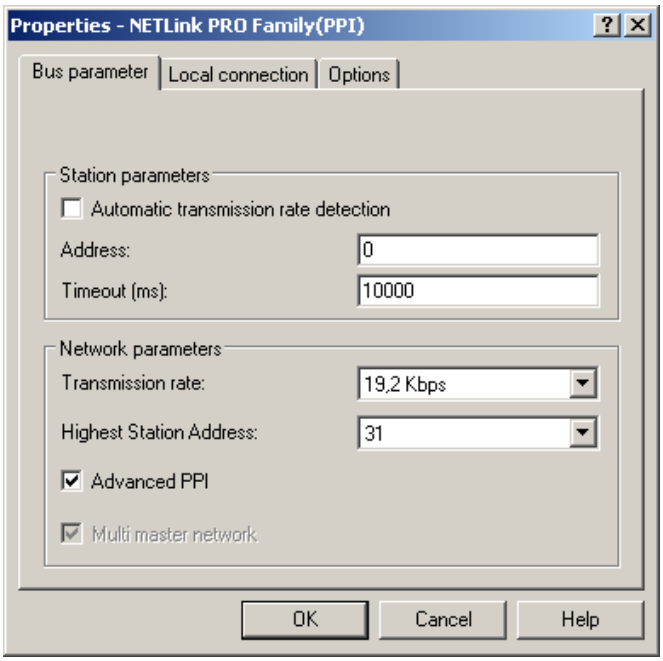
The screenshot above of a hardware configuration of a randomly chosen PROFIBUS CPU shows where to find the switch for cyclic distribution of the bus parameters.

5.1.3 PPI configuration

Basically, the same applies to PPI configuration as to MPI configuration. However, the network-related parameters are more extensive.

!

Normally the baud rate cannot be detected automatically at PPI systems.



In addition to the parameters transmission rate and highest station address mentioned in Section 5.1.1, PROFIBUS also has a parameter field for selecting the bus profile and bus parameters:

According to current knowledge, all S7-200 CPUs of the product line 22x should be able to communicate with '*Advanced PPI.*' It is recommended to use '*Advanced PPI*' if possible.

5.2 Local connection (TCP parameterization)

There are three basic ways of parameterizing NETLink® PRO Compact at the TCP end:

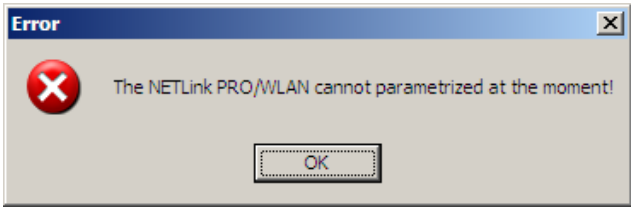
- Parameterization via 'Set *PG/PC interface*
  Existing stations can be reparameterized using the '*Change*' button
- Parameterization via the '*NETLink PRO Family configuration*' tool (see Section 6).
- Parameterization via the web interface of the NETLink® PRO Compact (see Section 7.3).

If the NETLink® PRO Compact is configured via the NETLink-S7-NET driver, the following points must be considered:

If the NETLink® PRO Compact is active on the bus when reparameterization is required (e.g. a variable table or block is being viewed), reparameterization is not performed.

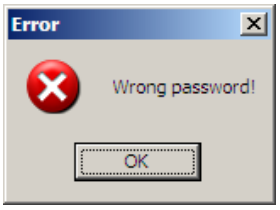
The ensuing reset would interrupt the NETLink® PRO Compact link

The password query must be answered correctly and confirmed with OK.



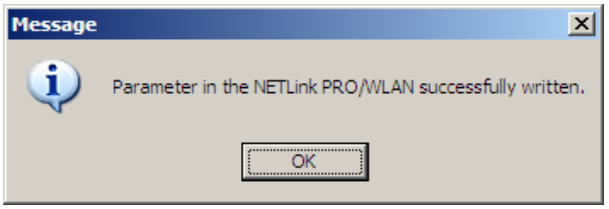
- The NETLink® PRO Compact can be protected against unauthorized reparameterization via a password (default password: “admin”).
  If an attempt is made to save a parameter set with an incorrect password, the following messages is displayed:

The default password is ‘admin.’



- If the password is correct during parameterization, the new parameter set will be saved and the following message displayed:

Rebooting can take up to 15 seconds.

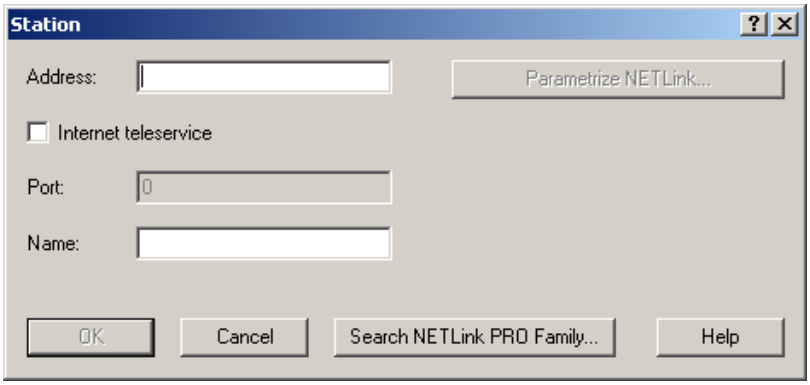


- NETLink® PRO Compact is now restarted. This can take up to 15 seconds.

5.2.1 Creating a station

The ‘*New*’ button takes you to an input dialog box in which you can store the known IP address of an existing NETLink® PRO Compact and any name for easier assignment.

The NETLink has the IP address 192.168.4.49 on delivery from the factory.



To able to access a NETLink® PRO Compact with the NETLink-S7-NET driver, a station must be set up first. This station is virtually and is not stored in the NETLink® PRO Compact hardware – it permits easier differentiation if several NETLink® PRO Compact and/or other devices from the NETLink® family are used.

If NAT/PAT is used, a port can be defined if 'Internet teleservice' is selected.

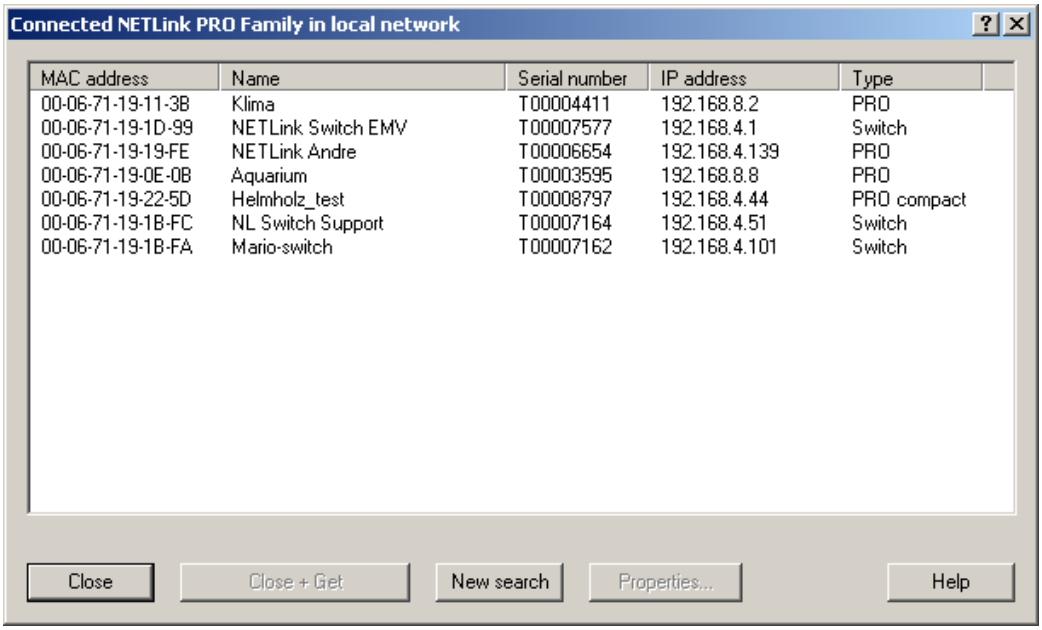
Is the desired NETLink® PRO Compact behind a router (e.g. internet teleservice), the network administrator is able to configure the router via NAT/PAT. So all frames going to a specific port of the router going to a specific NETLink® PRO Compact behind the router.

Using this functionality makes it possible to communicate to more as one NETLink® PRO Compact behind a router, if each station gets a specific port configuration.

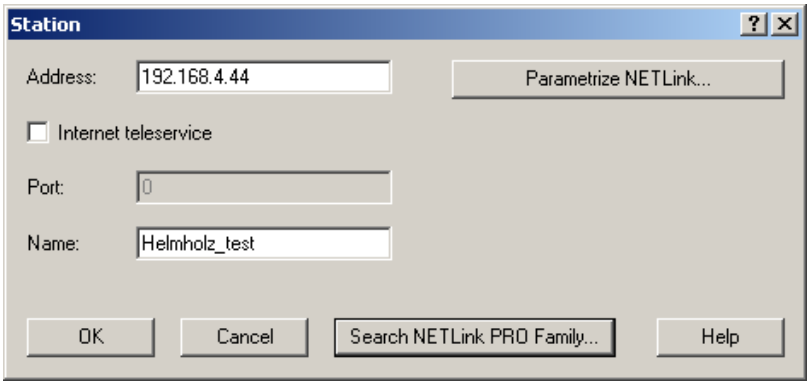
Is the NETLink® PRO Compact connected to the local network, the 'Internet teleservice' option must be deselected.

'*OK*' stores this station, which can now be used.

It is easier to search for an existing NETLink® PRO Compact in the local area network. Just click the '*Search NETLink PRO Family…*' button.



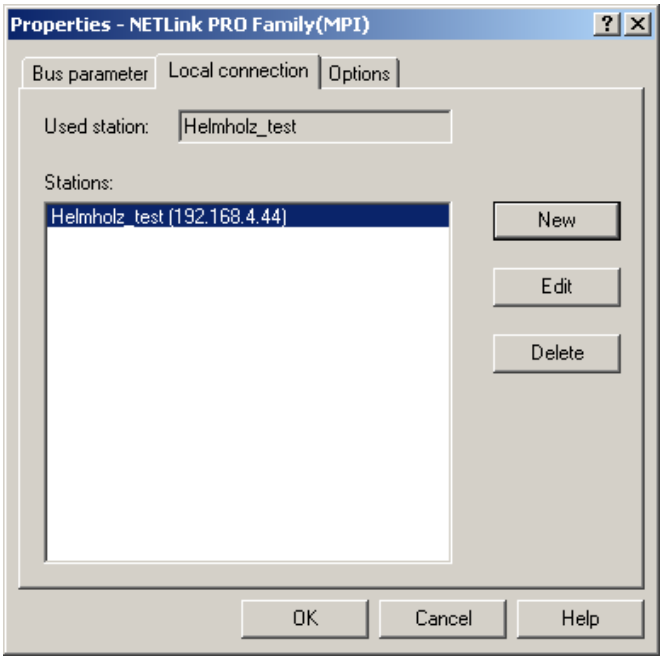
If you now select the required NETLink® PRO Compact and click the '*Close + Get*' button, the following dialog box will appear again:



This station can also be saved with '*OK*' and is then available.

If you do not want the name that is stored in the NETLink® PRO Compact to be the same as the station name, you can overwrite

the station name (e.g. replacing the name '*Helmholz_test*' with the name '*Workshop*' in the example below).

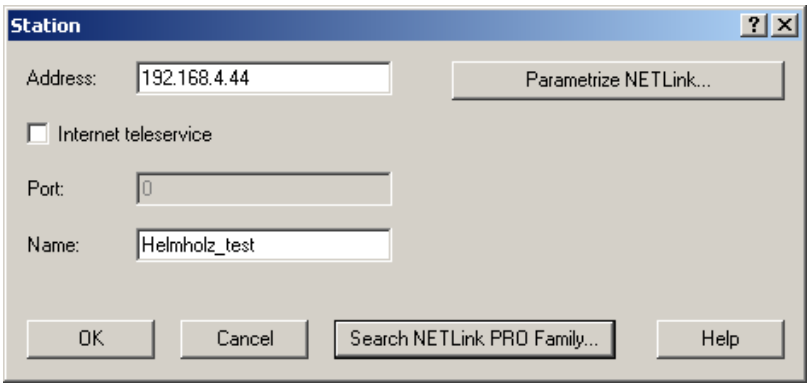


This completes parameterization of the driver.

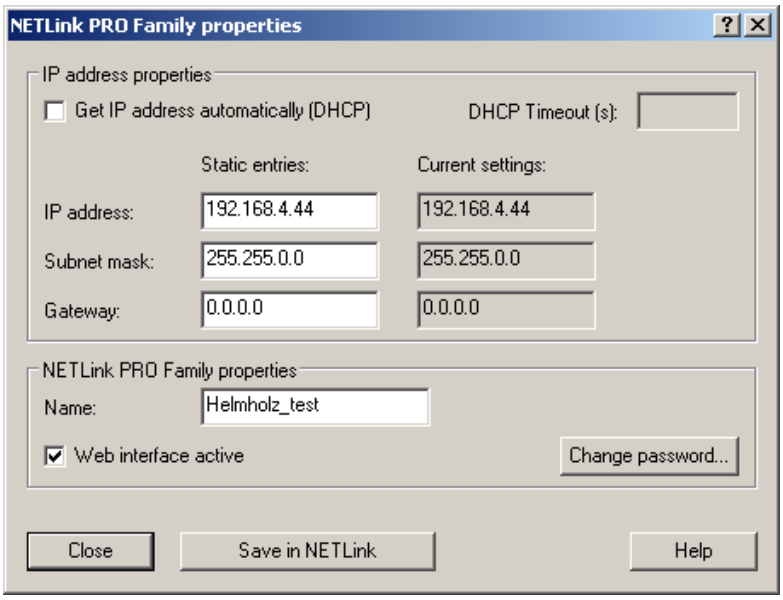
It may now be necessary to adapt the NETLink® PRO Compact to the situation in the existing TCP/IP network.

5.2.2 Setting TCP parameters

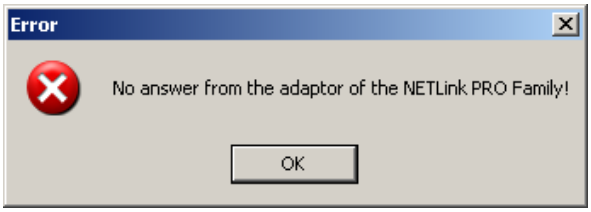
To change the TCP parameters, select the station in question and open the following dialog box with the '*Edit*' button.



The *'Parameterize NETLink ...'* button takes you to a new input form that already contains the current parameters of the NETLink® PRO Compact:



If no NETLink® PRO Compact can be accessed via the stated IP address, the following message will appear:



This message can have two causes:

- There is no NETLink® PRO Compact with the stated IP address (e.g. the device has not yet been switched on or is still starting up).
- The IP configuration of the computer used does not match the IP configuration of the stated NETLink® PRO Compact (e.g. different subnet mask settings).

From the parameterization form shown, it can be seen that not only static IP address allocation but also IP parameter assignment via DHCP is possible.

Both these options are now explained in more detail.

5.2.3 Operation without the DHCP

If NETLink® PRO Compact is used in a network without a DHCP server (or you want the NETLink® PRO Compact to work with the same IP address on the network despite the presence of a DHCP server) the required IP parameters are stored in the input forms for *'Static parameters.'*

In this case, the checkmark is not set in the field *'Get IP address automatically (DHCP).'*

Clicking the '*Save in NETLink PRO Family'* button saves the parameters in the NETLink® PRO Compact.

5.2.4 DHCP

To have the NETLink® PRO Compact receive its IP parameters automatically via DHCP, set a checkmark in the field '*Get IP address automatically (DHCP).*'

This then enables the '*DHCP Timeout (s)*' input field. Enter the maximum waiting time here. If the NETLink® PRO Compact does not receive any parameters from the DHCP server within this time, it will use the stored static parameters to ensure that the device is accessible in the network and can be configured if necessary.

Times shorter than 30 seconds are replaced by the default value (30 seconds) because most DHCP servers require 12 to 20 seconds to assign valid parameter sets.

Clicking the '*Save in NETLink®'* button saves the parameters in the NETLink® PRO Compact.

DHCP has the drawback that a NETLink® PRO Compact parameterized by this method could theoretically be assigned a different IP address from the DHCP every time it is switched on.

The system administrator responsible for the DHCOP server can counter this informing the DHCP server of the MAC address of the NETLink® PRO Compact. However, this is additional work for the system administrator.

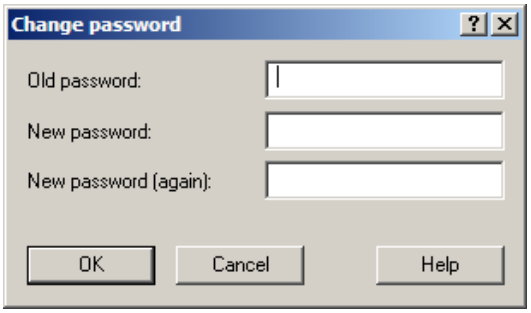
5.2.5 Additional features

The '*NETLink PRO Family properties*' input form contains a '*NetLink PRO Family properties*' group box with further options that are explained here:

- Name:
  Here a name can be given to the NETLink® PRO Compact that identifies it better when it is shown in the search window. The name is stored in the device.
  The name may designate the location (e.g. conveyor HG1), the user (e.g. Mr. Example), or anything else.
- Web interface active:
  If there is a checkmark in this checkbox, the parameterization of the NETLink® PRO Compact can be viewed and changed, if necessary, in any standard Browser (e.g. IE, Firefox, Opera …) as long as the password (if one has been set) is known.
  Section 7 provides more detailed information about what you can do with the web interface.

- Changing the password:
  Here you can change the actual password.
  It is only possible to change the configuration of the NETLink® PRO Compact with the password. This applies to parameterization both via the driver and via the web interface.

The default password is 'admin.'

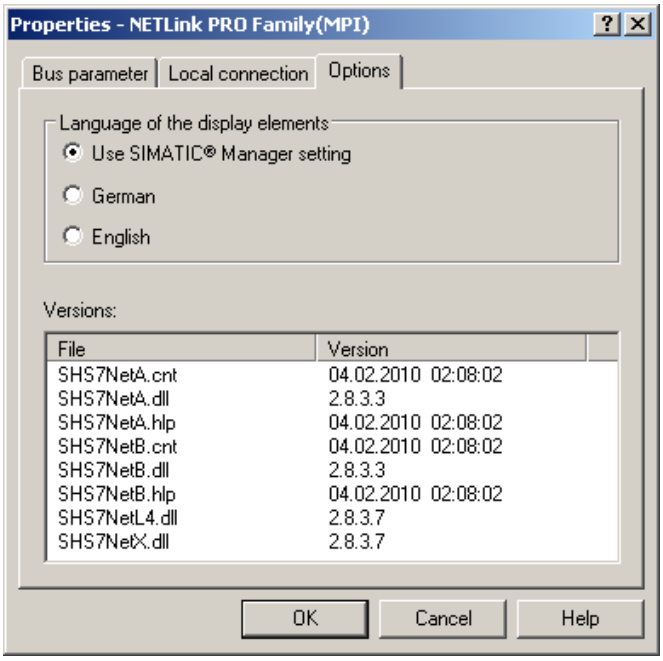


Clicking the '*Save in NETLink®*' button saves the parameters in the NETLink® PRO Compact in this case, too.

5.3 Options of the driver

Under the options of the NETLink-S7-NET driver, it is possible to set the language of the output and help texts of the driver.

It is also possible to read out the version numbers of the driver files used.



5.3.1 Language setting of the display elements

The languages German and English are currently available.

After switching over the language, the setting window must be opened again to apply the changes.

5.3.2 Version information

The names and version number of all driver files are listed here.

If support is needed, this data is used to obtain information about the components used quickly and effectively.

5.4 Diagnostics

For rudimentary diagnostics of the connected bus two sub functions are available:

- Display bus nodes
- Display bus parameters

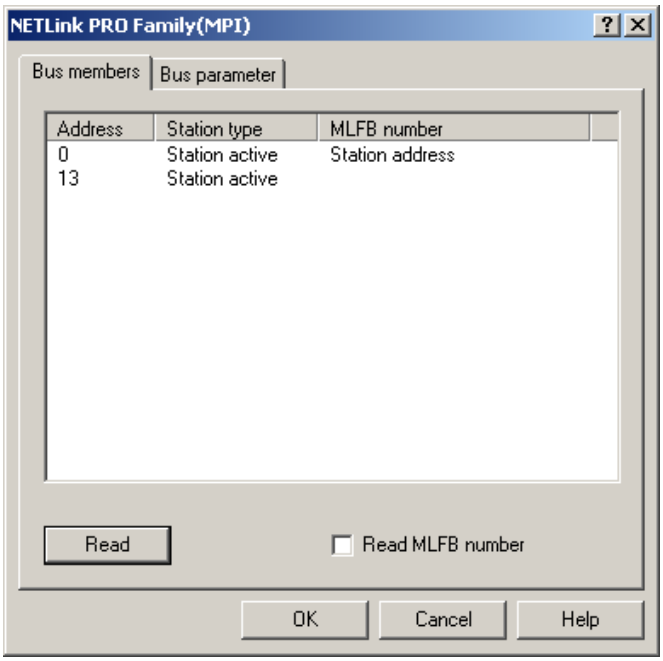
Before the diagnostics functionality is used, a valid station must be created and a plausible bus configuration set.

5.4.1 Bus members

A list of all available nodes at the bus will be generated by clicking the button *'Read.'*

With activating the option *'Read MLFB number'* the order numbers of all devices supporting this function will be displayed too.

The possibility to detect all connected nodes depends on the parameterization of the PG/PC Interface. It is recommended to enable auto baud functionality at MPI and PROFIBUS.

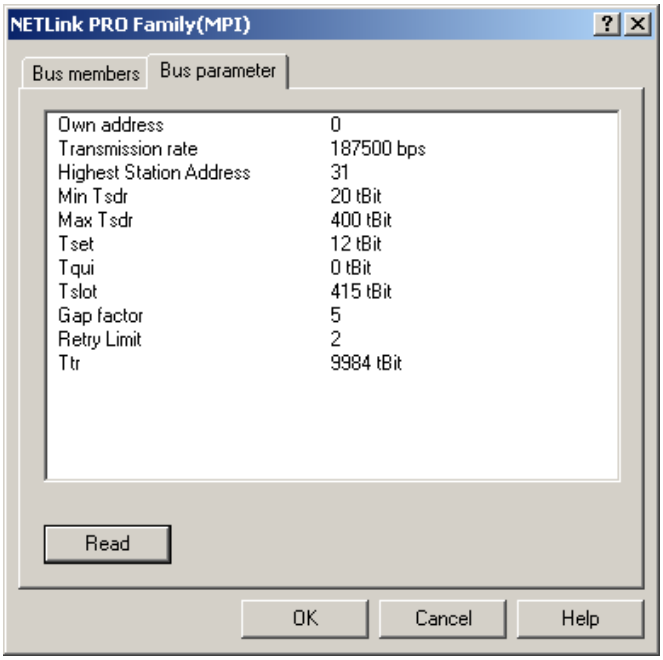


5.4.2 Bus parameters

If it is possible a list of all bus parameters will be displayed by clicking the button *'Read.'*

The possibility to detect the bus parameters depends on the parameterization of the PG/PC Interface.

It is recommended to enable auto baud functionality at MPI and PROFIBUS.



5.5 Teleservice

If you want to use the NETLink® PRO Compact for teleservice, you should consult the network administrators of both the locations involved.

There are various ways of implementing teleservice via a WAN. Here are some suggestions:

- Assignment of a separate, unique IP address with direct access to the network (WAN).

Advantage: Quick to implement
No intervention by the administrator required
Disadvantage: Few globally available addresses exist,
A separate network with direct WAN access is required, Security

- Use behind a router by means of NAT/PAT

Advantage: Can be integrated into existing infrastructures.
Administrator can ensure that it is not visible/usable from outside.
Disadvantage: Network administrators must parameterize routers and firewalls between the communicating nodes.

- Use of a dial-up router (e.g. NETLink® Router)

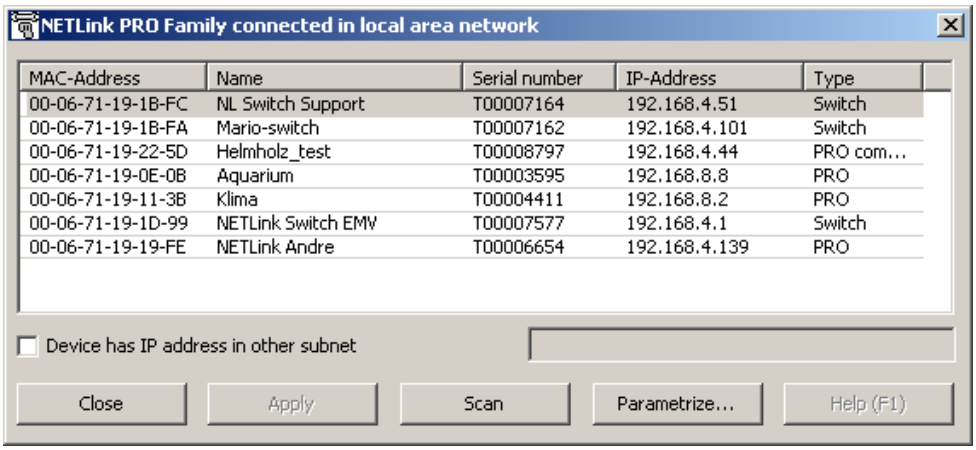
Advantage: relatively simple to implement if a phone connection is available.
Disadvantage: Loss of performance, additional costs due to phone charges, IP address can only be queried remotely via DynDNS services.

6 The Tool: '*NETLink® PRO Family Configuration*'

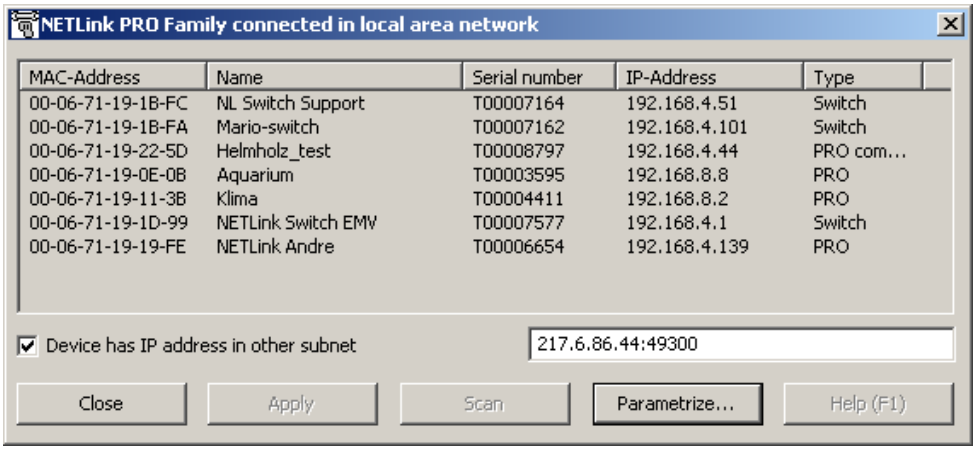
If no Simatic engineering tool is available on the parameterization computer that has installed the PG/PC interface, it is possible to configure the NETLink® PRO Compact via the integrated web interface (see Section 7.3) or via the separate configuration tool.

The tool is accessible under '*Start/Programs/Systeme Helmholz/NETLink-S7-NET/NETLink PRO Family Configuration*' after the NETLink-S7-NET driver has been installed.
After this program has been called, the network will be searched for connected NETLink® MAC addresses:

The set IP address of the connected NETLink® devices is not relevant for search function. The search function uses the device-specific MAC addresses. All other data in the list is for information only.


NETLink PRO Family connected in local area network
MAC-Address Name Serial number IP-Address Type
00-06-71-19-1B-FC NL Switch Support T00007164 192.168.4.51 Switch
00-06-71-19-1B-FA Mario-switch T00007162 192.168.4.101 Switch
00-06-71-19-22-5D Helmholz_test T00008797 192.168.4.44 PRO com...
00-06-71-19-0E-0B Aquarium T00003595 192.168.8.8 PRO
00-06-71-19-11-3B Klima T00004411 192.168.8.2 PRO
00-06-71-19-1D-99 NETLink Switch EMV T00007577 192.168.4.1 Switch
00-06-71-19-19-FE NETLink Andre T00006654 192.168.4.139 PRO
Device has IP address in other subnet
Close
Apply
Scan
Parametrize...
Help (F1)

The scan can be repeated at any time by pressing the "*Scan*" button again. Having chosen any NETLink® adapter out of the provided list, it is possible to configure the device after clicking '*Parametrize...*' as described in Section 5.


NETLink PRO Family connected in local area network
MAC-Address Name Serial number IP-Address Type
00-06-71-19-1B-FC NL Switch Support T00007164 192.168.4.51 Switch
00-06-71-19-1B-FA Mario-switch T00007162 192.168.4.101 Switch
00-06-71-19-22-5D Helmholz_test T00008797 192.168.4.44 PRO com...
00-06-71-19-0E-0B Aquarium T00003595 192.168.8.8 PRO
00-06-71-19-11-3B Klima T00004411 192.168.8.2 PRO
00-06-71-19-1D-99 NETLink Switch EMV T00007577 192.168.4.1 Switch
00-06-71-19-19-FE NETLink Andre T00006654 192.168.4.139 PRO
Device has IP address in other subnet
217.6.86.44:49300
Close
Apply
Scan
Parametrize...
Help (F1)

An extended function enables direct parameterization across network boundaries. To do this, activate the radio button and enter the known IP address of the NETLink® (the example includes the optional address of the port – separated by a colon) in the empty field. The corresponding configuration menu then opens when *"Parameterize..."* is clicked.

7 Possibilities of the Web Interface

If it has not been deactivated by the user, the web interface of the NETLink® PRO Compact can be opened with any standard browser (e.g. Internet Explorer, Firefox, Opera, etc.)

The web interface is intended to support the user intuitively with information and configuration tasks.

The NETLink® PRO Compact has the IP address 192.168.4.49 on delivery from the factory.

7.1 Home page

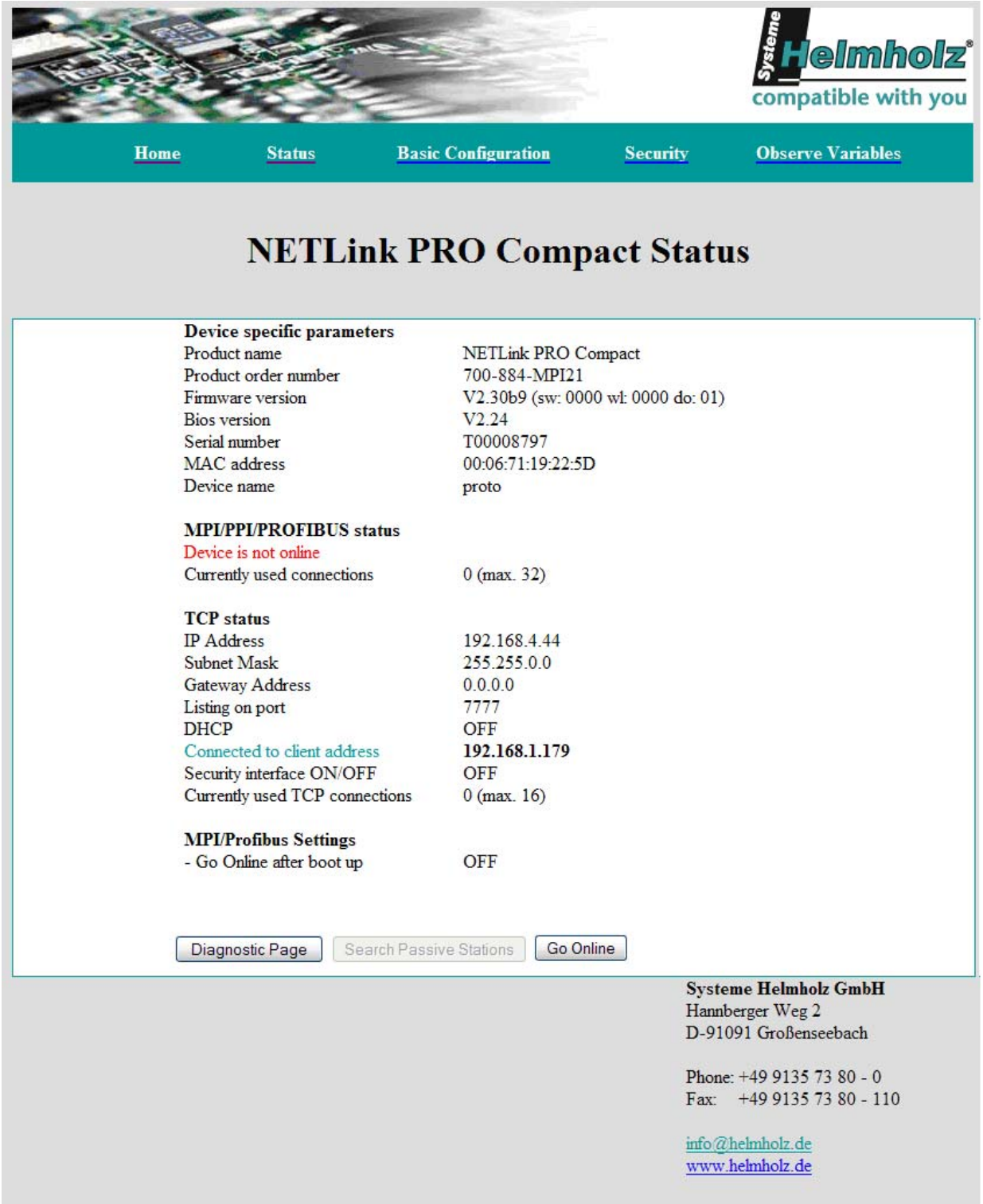
The home page, which is located at '*http://<ip-address>*,' is a basic address and navigation starting point for the user.

From this page you can go to the status page, to the Basic Configuration page, to the security page and, if the computer is connected to the Internet, to the web site of Systeme Helmholz GmbH.

The page also shows the contact data, such as postal address, phone and fax number, e-mail and web address.

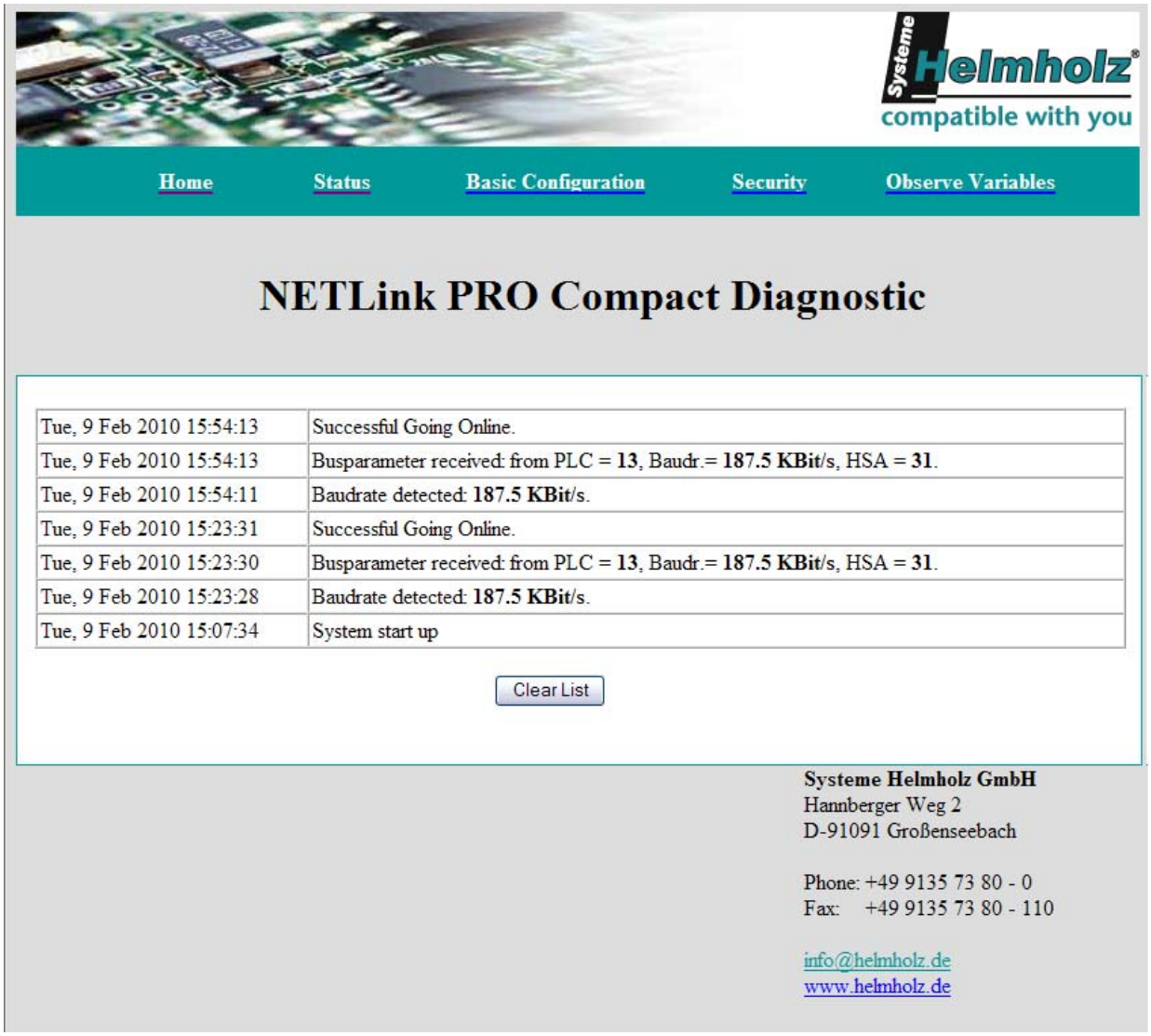
7.2 Status page

The status page, accessible via a link on the home page, provides the user with information without allowing unauthorized reconfiguration of the NETLink® PRO Compact.



The page provides general information (e.g. firmware version, number of possible connections, etc.), and specific information (baud rate, active stations, DHCP status, etc.). A "*Diagnostic Page*" is also implemented, which can be useful for troubleshooting, for example. To make use of this function, "*Go Online*" must be acti-

vated for the NETLink® PRO Compact on the bus system. This can be done with an engineering tool such as STEP7 or by using the *"Go Online"* button on the status page. This function can also be switched on permanently on the *"Basic Configuration"* page (see Section 7.3).

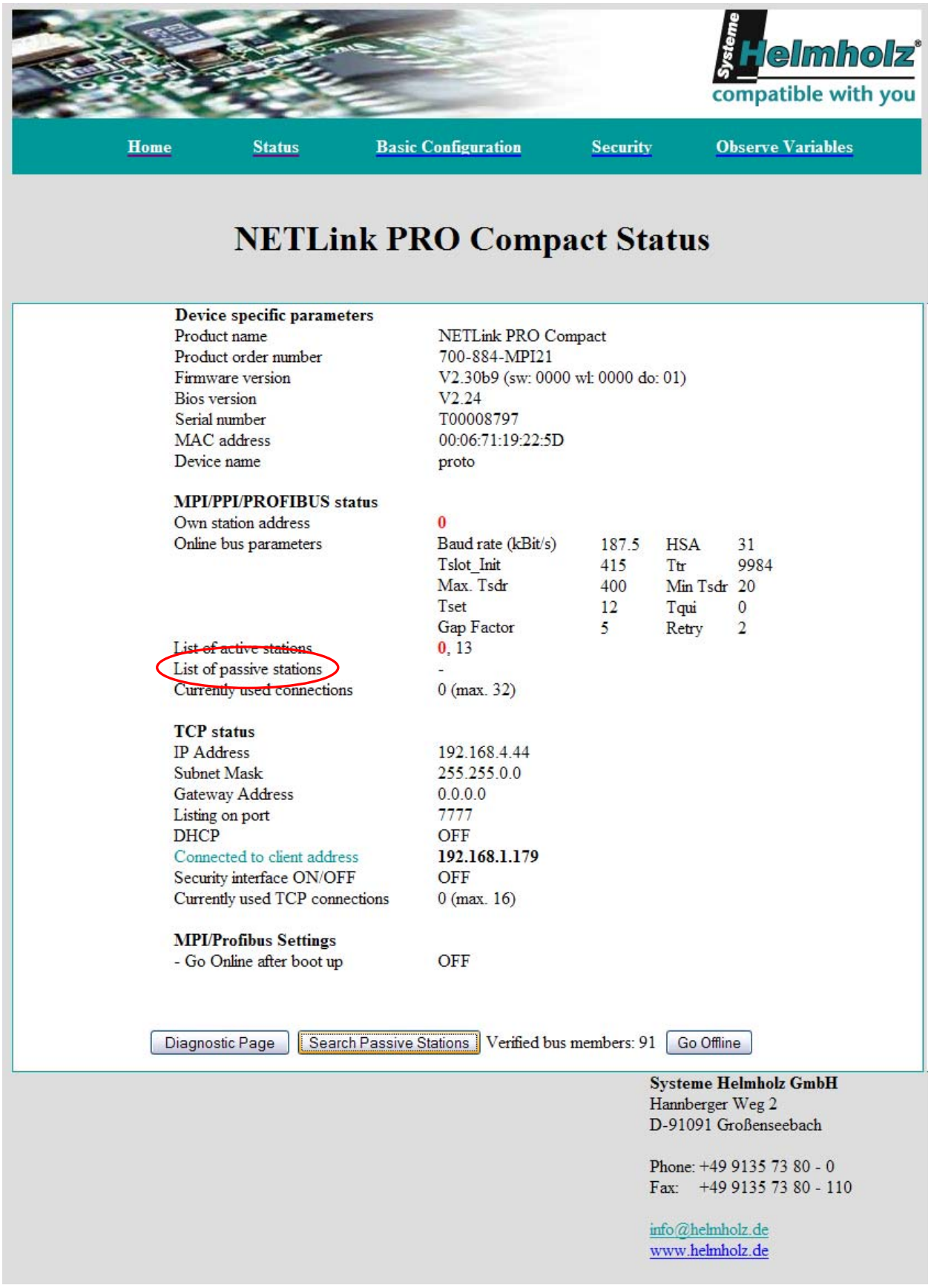

Systeme Helmholz
compatible with you
Home
Status
Basic Configuration
Security
Observe Variables
NETLink PRO Compact Diagnostic
Tue, 9 Feb 2010 15:54:13 Successful Going Online.
Tue, 9 Feb 2010 15:54:13 Busparameter received: from PLC = 13, Baudr.= 187.5 KBit/s, HSA = 31.
Tue, 9 Feb 2010 15:54:11 Baudrate detected: 187.5 KBit/s.
Tue, 9 Feb 2010 15:23:31 Successful Going Online.
Tue, 9 Feb 2010 15:23:30 Busparameter received: from PLC = 13, Baudr.= 187.5 KBit/s, HSA = 31.
Tue, 9 Feb 2010 15:23:28 Baudrate detected: 187.5 KBit/s.
Tue, 9 Feb 2010 15:07:34 System start up
Clear List
Systeme Helmholz GmbH
Hannberger Weg 2
D-91091 Großenseebach
Phone: +49 9135 73 80 - 0
Fax: +49 9135 73 80 - 110
info@helmholz.de
www.helmholz.de

The values shown here are volatile!

When the *"Diagnostic Page"* button is pressed, if the bus system is correctly connected, a list of the currently most important communications parameters will be shown. For a better overview, the table can be emptied with the *"Clear List"* function before a new list is requested.

Because the NETLink® PRO Compact is also active as a single master, it is also possible to search for passive stations only. The search is started by clicking *"Search Passive Stations."* The updated status of verified stations is then displayed.

The result is entered in line: *List of passive stations.*



All displayed elements are shown below in the form of a table.

All the relevant contents appear in the displayed configuration, which means that the NETLink® PRO Compact has signed onto the bus system (is online).

Device-specific parameters:

Product name	NETLink® PRO Compact
Product order number	700-884-MPI21
Firmware version	e.g. V2.30
BIOS version	e.g. V2.240
Serial number	e.g. T00008797
MAC address	e.g. 00:06:71:19:22:5D
Device name	This shows the freely selectable name of the NETLink® PRO Compact, if a name has been assigned.

Bus-specific parameters:

Own station address	If the NETLink® PRO Compact is active on the bus, this is the device's own station address.
Online bus parameters	If the NETLink® PRO Compact is active on the bus, this is the explanation of the bus parameter set, this is transmitted by a CPU.
List of active stations	If the NETLink® PRO Compact is active on the bus, this is the list of the stations that are currently active. The device's own address is shown in red.
List of passive stations	After a search request by a user, a list of passive stations is output here.
Currently used connections	If the NETLink® PRO Compact has opened at least one bus connection, the exact count of open connections will be displayed.

TCP-specific parameters:

IP Address	The currently used IP address of the NETLink® PRO Compact is shown (e.g. 192.168.4.44).
Subnet Mask	The currently used subnet mask of the NETLink® PRO Compact is shown (e.g. 255.255.0.0).
Gateway Address	If it has been set by the user, the standard gateway currently used will be displayed here (e.g. 192.168.1.1).
Listen on Port	Port or ports via which the NETLink® PRO Compact can be reached by the PG/PC interface.
DHCP (- DHCP timeout)	Shows whether the DHCP is activated or not (ON or OFF). In active mode, the DHCP timeout is also displayed here.
Connected to client address	IP address of the computer that has just established a connection to the NETLink® PRO Compact.
Security interface ON/OFF	Indicates whether the IP address access protection is activated.
Currently used TCP connections	If the NETLink® PRO Compact has opened at least one TCP or RFC1006, the exact count of open TCP connections will be displayed here (maximum value shown in brackets).

Bus-specific settings:

- Go online after boot up	Shows whether the function for automatic connection is activated or not (ON or OFF).
- Own station address	Indicates the local station address. This is the address with which the NETLink® PRO Compact will participate in the bus cycle.
- Rack/Slot mode ON/OFF	Indicates whether R/S mode (ON) or addressed mode (OFF) is used (for details, see Section 9.2).
- Currently used RFC connections	If the NETLink® PRO Compact has opened at least one TCP or RFC1006, the exact count of open connections will be displayed here (maximum value shown in brackets).

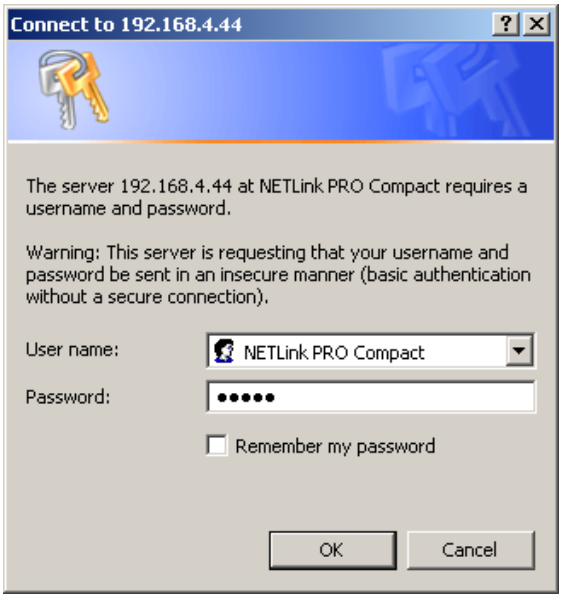
7.3 Configuration page

The configuration page, accessible via a link on the home page, is a configuration interface for the user.

The default user name is "NETLink PRO Compact"

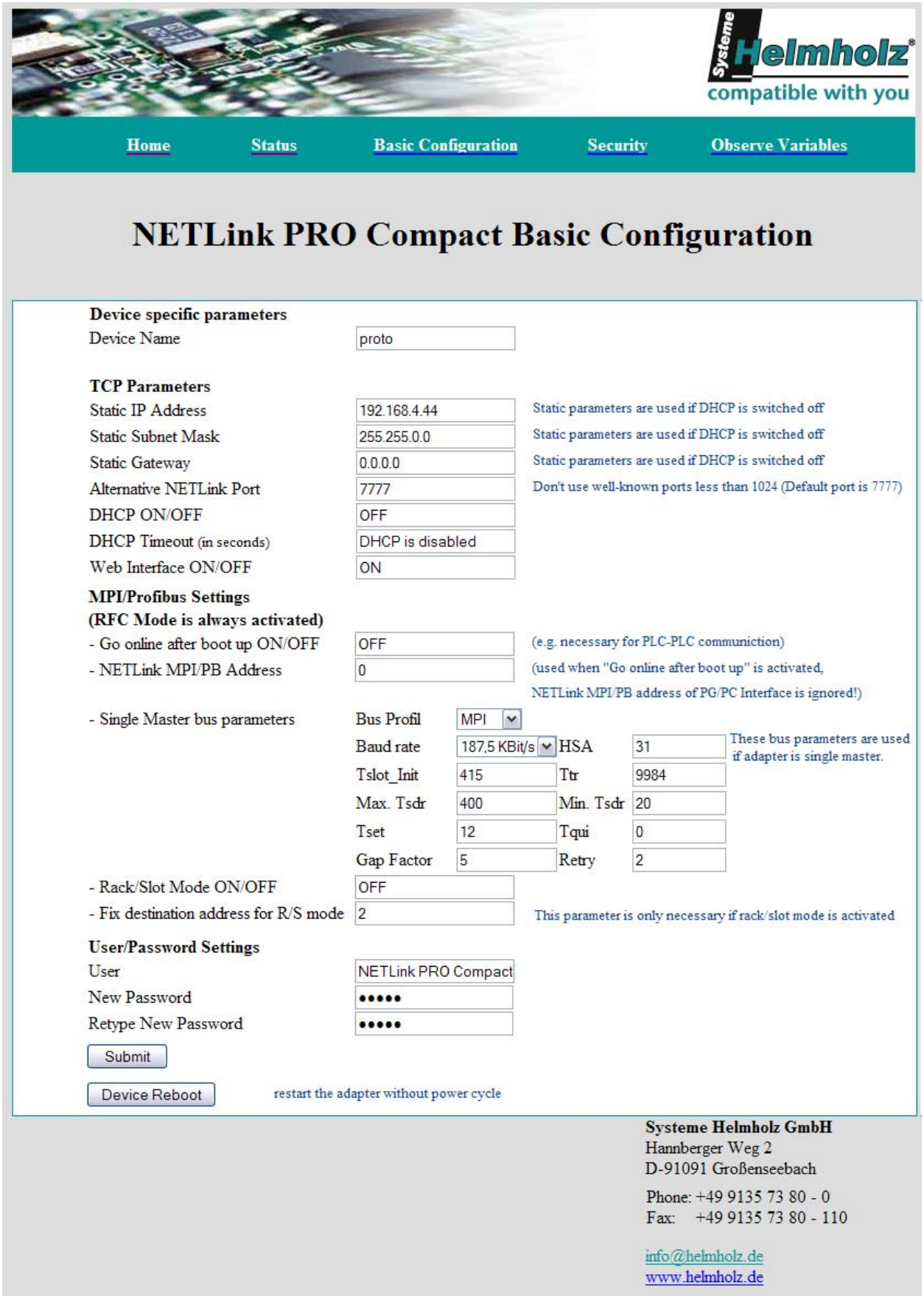
The default password is 'admin.'

Before this page is opened, the user name (default: *NETLink PRO Compact,* if no user-defined user name is entered) and the password (*admin* if no user-defined password has been set) must be entered.


Connect to 192.168.4.44
The server 192.168.4.44 at NETLink PRO Compact requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
NETLink PRO Compact
Password:
Remember my password
OK
Cancel

The confirmation prompt is case sensitive. So you must remember which upper and lower case letters you used.

As soon as you have answered the security query, you will have write access to all parameters.



The bus parameters can also be adapted to the single master functionalities. For further details on the RFC1006 function see Section 8.

Device-specific parameters:

Device name	Name consisting of max. 20 alphanumeric characters.

TCP parameters:

Static IP address	IP address that is used if DHCP is deactivated or the DHCP timeout elapses.
Static subnet mask	Subnet mask that is used if DHCP is deactivated or the DHCP timeout elapses.
Static gateway	Gateway that is used if DHCP is deactivated or the DHCP timeout elapses.
Alternative NETLink Port	In addition to the standard port, a further freely selectable port can be stored here in the NETLink® PRO Compact.
DHCP ON/OFF	Automatic fetching of address parameters from a DHCP server ON or OFF.
DHCP Timeout (in seconds)	Possible range: 30 to 65535 seconds. Timeout is deactivated at 65535. In this case, there is no fallback mechanism, i.e. it is essential that a DHCP server is accessible!
Web-Interface ON/OFF	Web interface is ON or OFF

Bus-specific parameters:

Go online after boot up ON/OFF	The need to go “online” immediately is largely only relevant when CPU-to-CPU communication is used.
NETLink MPI/PB Address	This is where the address with which the NETLink® PRO Compact will participate in the bus cycle is entered. Any address assigned at another location (e.g. by the SHS7-Net driver) is then ignored.
Single Master bus parameters	The bus parameters specified here are used if the single master function is active.
Rack/Slot modus ON/OFF	Indicates whether R/S mode (ON) or addressed mode (OFF) is used (for details, see Section 9.2).
Fix destination address for R/S mode	If R/S mode is activated, all incoming RFC1006 requests are routed to the bus address parameterized here.

For further information, see Section 9

User/password settings:

User	User name needed to sign on to the security-relevant pages of the NETLink® PRO Compact
New password	Password of max. eight characters
Retype new password	The password of max. eight characters must be entered a second time

Please remember that the user names/passwords that you have defined for this configuration interface cannot be reset by any “master reset”. Please contact our technical support if you are no longer able to access the safety-relevant pages of the Web interface with the access data known to you.

If you click the '*Submit*' button, the inputs are checked for plausibility. You may then be shown which inputs are incorrect and what correct input would look like at this point.

If all entries are consistent, the changes are displayed again as they will now be stored non-volatilely in the NETLink® PRO Compact when you click the '*Store*' button again.

Rebooting can take up to 15 seconds.

After the changed parameterization data have been stored, the NETLink® PRO Compact is restarted to activate the desired configuration.

With the Web interface, NETLink® PRO Compact can be started both locally and remotely, as required. This is done by clicking the '*Device Reboot*' button.

7.4 Security page

The security page, which is also accessible via a link on the home page, is a configuration interface available to the user for limiting access.

After the security query (see 7.3) has been correctly answered, the user has write-access to all parameters that are implemented for TCP security etc.

If the TCP access list is switched on by entering '*ON*,' stations, TCP connections can be established with the NETLink® PRO Compact only from stations that have addresses configured in the table '*TCP address 1*' to '*TCP address 12*' (white list).

The IP addresses must be entered in the four-octet pattern (e.g. '*192.168.4.36.*') To clear or reset the TCP address setting, '*OFF*' must be entered.

TCP/IP addresses that are not in the white list have read-only access to the web interface. MPI, PPI, or PROFIBUS functionalities cannot be used. The configuration of the NETLink® PRO Compact is also prevented.

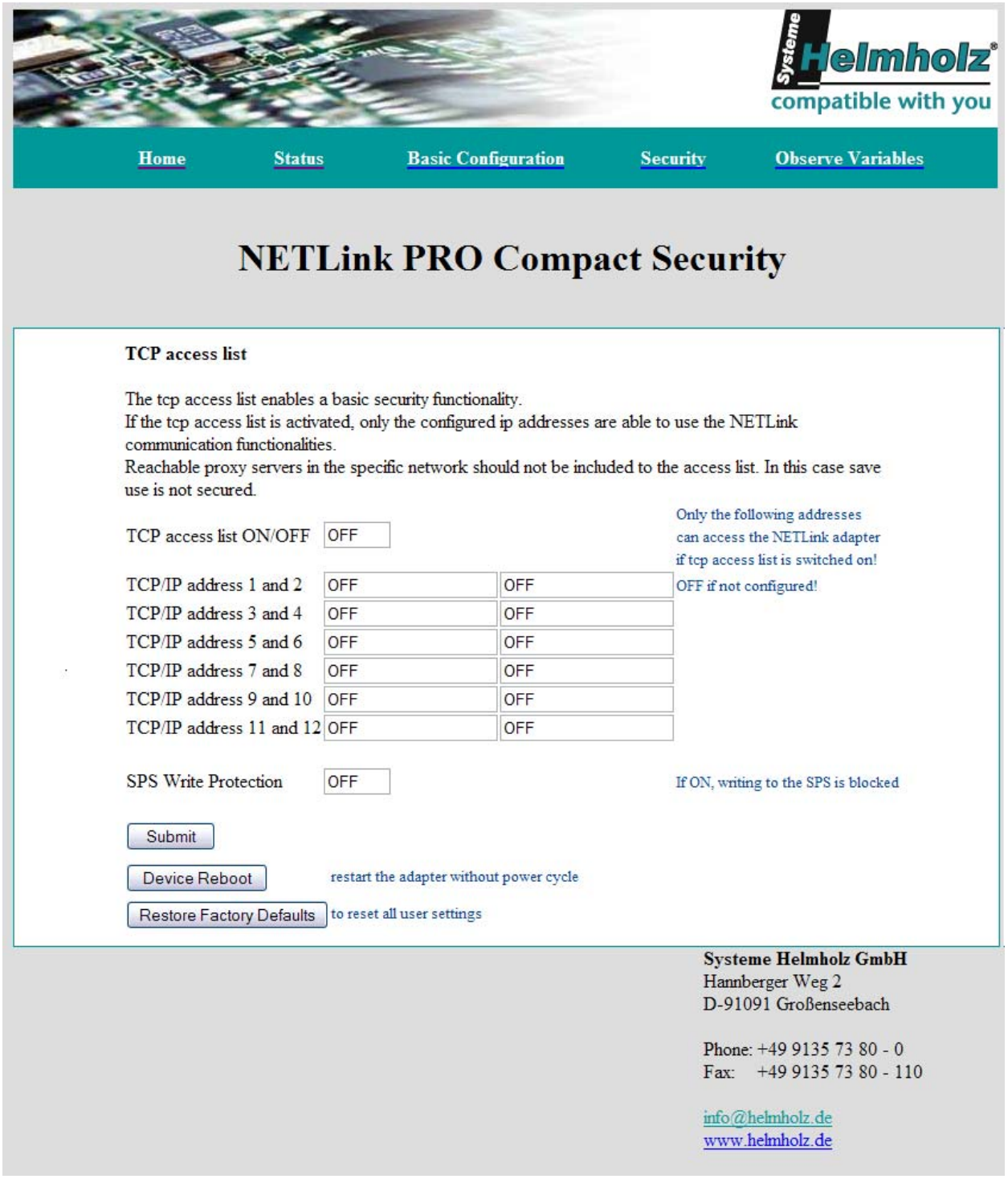
It is also possible to activate additional write protection for any bus nodes connected to the NETLink® PRO Compact. If the NETLink® PRO Compact is used, for example, as a communications adapter for representing visualization values, only data from the connected controllers can be read out if write protection is active. In this way, manipulation of the CPU sequential program is ruled out.

This assumes, of course, that the access data for the NETLink® PRO Compact web interface are secure.

Notice deviation by usage of proxy servers.

Attention: To prevent their use by unauthorized persons, any proxy servers that exist in company networks may not be entered in the white list. If so, safe use of the NETLink® PRO Compact is not guaranteed.

With the button '*Factory defaults*' it is possible to restore all parameters to the as-delivered state of the NETLink® PRO Compact. All user-defined configurations will be deleted by this function.


Systeme Helmholz
compatible with you
Home
Status
Basic Configuration
Security
Observe Variables
NETLink PRO Compact Security
TCP access list
The tcp access list enables a basic security functionality.
If the tcp access list is activated, only the configured ip addresses are able to use the NETLink communication functionalities.
Reachable proxy servers in the specific network should not be included to the access list. In this case save use is not secured.
TCP access list ON/OFF
OFF
Only the following addresses can access the NETLink adapter if tcp access list is switched on!
TCP/IP address 1 and 2
TCP/IP address 3 and 4
TCP/IP address 5 and 6
TCP/IP address 7 and 8
TCP/IP address 9 and 10
TCP/IP address 11 and 12
OFF if not configured!
SPS Write Protection
If ON, writing to the SPS is blocked
Submit
Device Reboot
restart the adapter without power cycle
Restore Factory Defaults
to reset all user settings
Systeme Helmholz GmbH
Hannberger Weg 2
D-91091 Großenseebach
Phone: +49 9135 73 80 - 0
Fax: +49 9135 73 80 - 110
info@helmholz.de
www.helmholz.de

If you click the '*Submit*' button, the inputs are checked for plausibility. You may then be shown which inputs are incorrect and what correct input would look like at this point.

If all entries are consistent, the changes are displayed again as they will now be stored non-volatile in the NETLink® PRO Compact when you click the '*Store*' button again.

Rebooting can take up to 15 seconds.

After the new parameterization data have been stored, the NETLink® PRO Compact is restarted to activate the new configuration.

Parameters of the TCP access list:

TCP access list ON/OFF	Switch ON/OFF the functionality of the TCP access list.
TCP/IP address 1 and 2	First and second IP addresses that are allowed to access the NETLink® PRO Compact.
TCP/IP address 3 and 4	Third and fourth IP addresses that are allowed to access the NETLink® PRO Compact.
TCP/IP address 5 and 6	Fifth and sixth IP addresses that are allowed to access the NETLink® PRO Compact.
TCP/IP address 7 and 8	Seventh and eighth IP addresses that are allowed to access the NETLink® PRO Compact.
TCP/IP address 9 and 10	Ninth and tenth IP addresses that are allowed to access the NETLink® PRO Compact.
TCP/IP address 11 and 12	Eleventh and twelfth IP that are allowed to access the NETLink® PRO Compact.
SPS write Protection	PLC write-protection ON or OFF

NETLink® PRO Compact can be started both locally and remotely via the security interface. This is done by clicking the '*Device Reboot*' button.

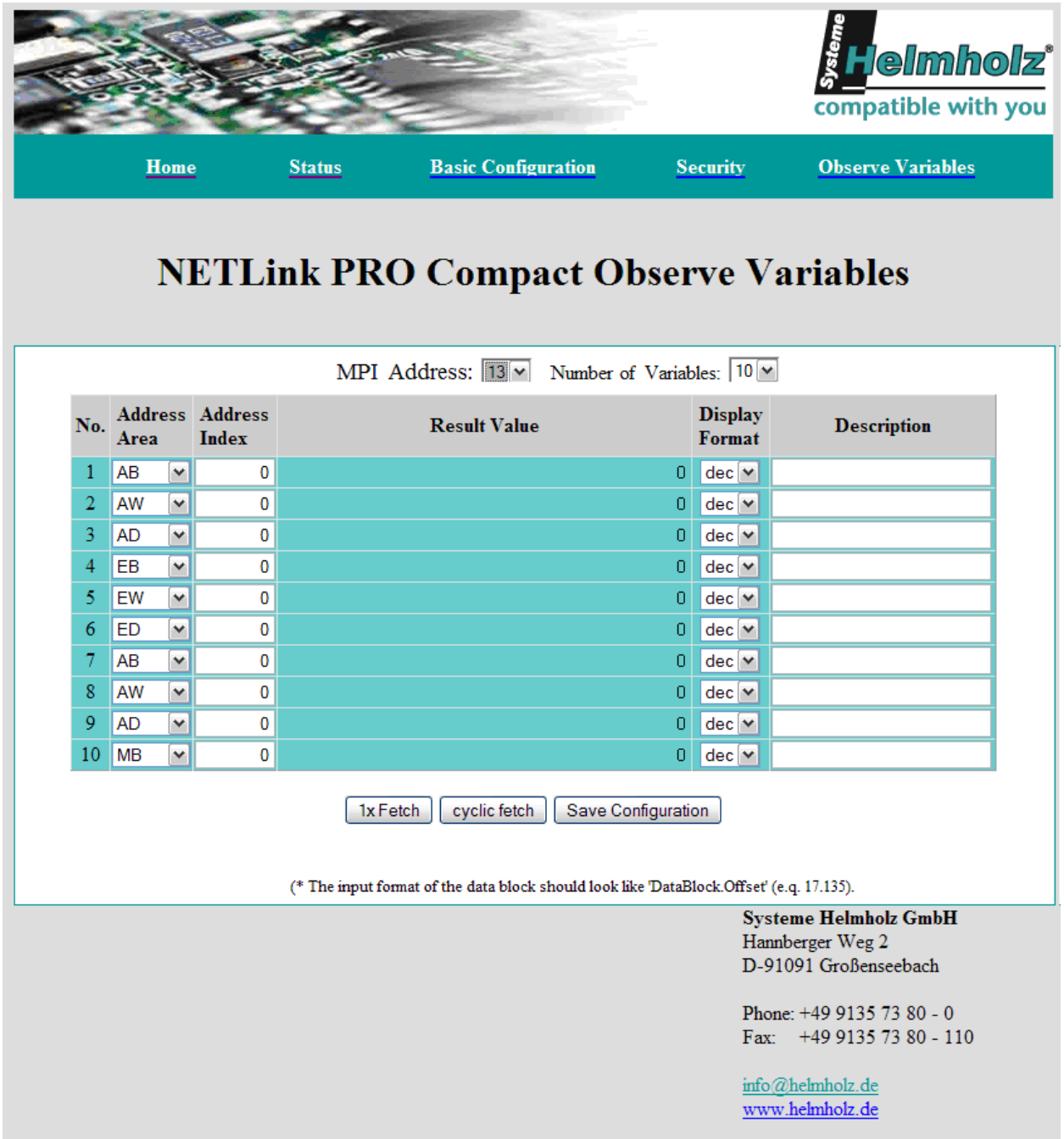
7.5 Observing variables

In addition to the "*Observing Variables*" function in the Simatic engineering tools, NETLink® PRO Compact also provides this function via the web interface.

Setting parameters of the observe variables function:

MPI address	An active MPI/PB address is selected using the dropdown menu.
Number of Variables	The number of variables to be observed can be selected from 1 to 10 for a clearer view.
No.	Consecutive numbering.
Address Area	The following viewable items are supported: OB, OW, OD, IB, IW, ID, MB, MW, MD, DBB, DBW, DBD, counter, and timer.
Address Index*	Address of the bytes to be displayed. * On the case of data blocks with the form "Datablock.Offset"
Result Value	If one of the buttons is pressed, the output value will be displayed here
Display Format	Display formats: decimal, hexadecimal, or binary
Description	Freely selectable description (max. 32 chars)

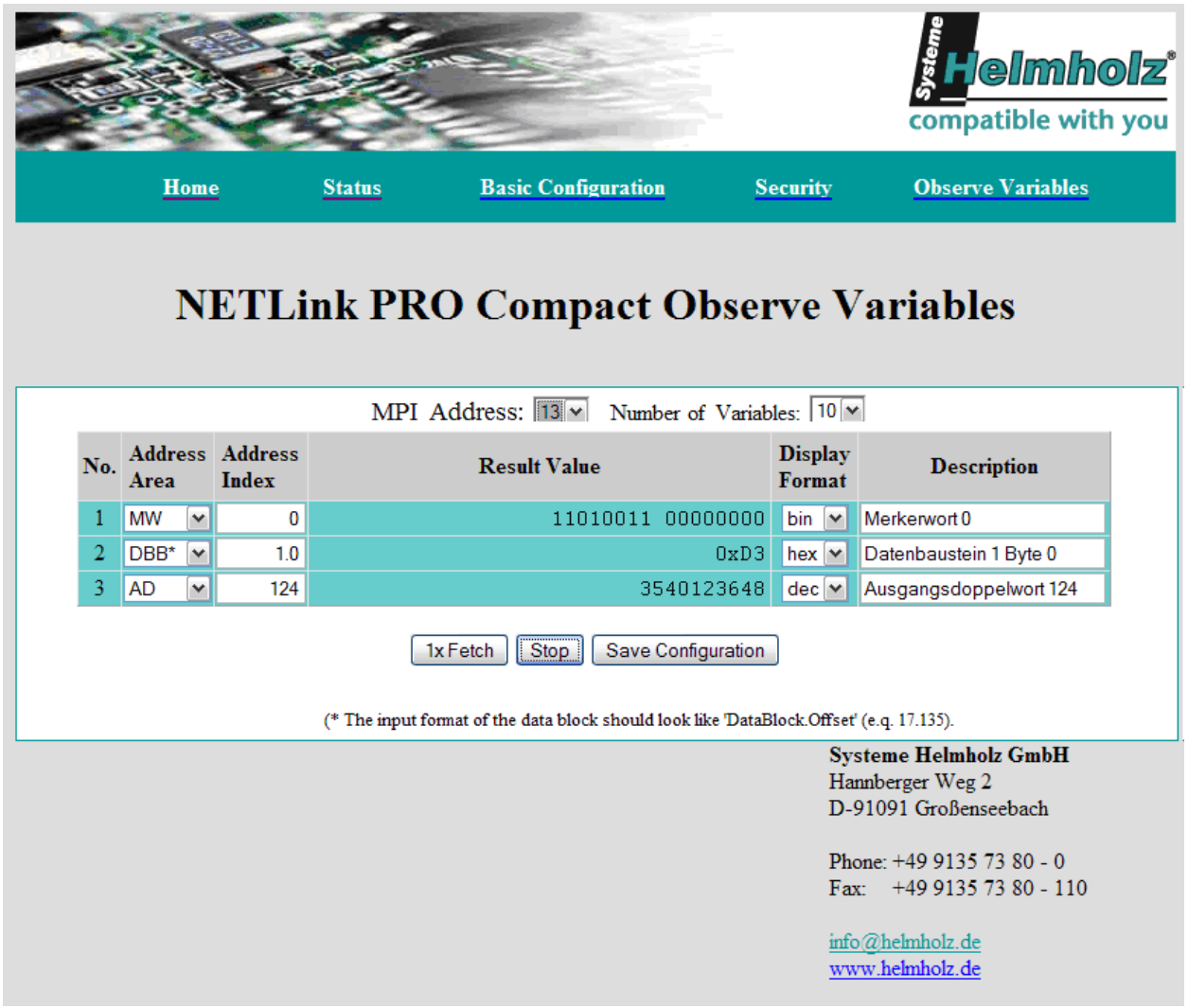
The operating menu can be accessed via the '*Observe Variables*' link. An RFC 1006 communications channel is assigned for these functions.



To display the desired values, you can use the '*1x fetch*' button for a single value update or '*cyclic fetch*' for a permanent online query.

With '*Save Configuration*', it is possible to store the screen form you have created with all the variables and their descriptions in the NETLink® PRO Compact.

An example of display of various variables:

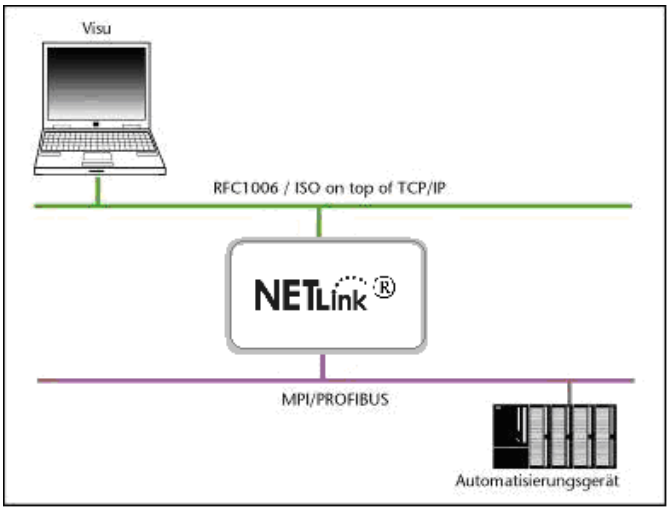

Systeme Helmholz
compatible with you
Home
Status
Basic Configuration
Security
Observe Variables
NETLink PRO Compact Observe Variables
MPI Address: 13 Number of Variables: 10
No. | Address Area | Address Index | Result Value | Display Format | Description
1 | MW | 0 | 11010011 00000000 | bin | Merkerwort 0
2 | DBB* | 1.0 | 0xD3 | hex | Datenbaustein 1 Byte 0
3 | AD | 124 | 3540123648 | dec | Ausgangsdoppelwort 124
1x Fetch
Stop
Save Configuration
(* The input format of the data block should look like 'DataBlock.Offset' (e.q. 17.135).
Systeme Helmholz GmbH
Hannberger Weg 2
D-91091 Großenseebach
Phone: +49 9135 73 80 - 0
Fax: +49 9135 73 80 - 110
info@helmholz.de
www.helmholz.de

The value update is currently permanently set to 0.5 seconds. Even if multiple stations access this function from the TCP/IP end, only one connection resource is ever assigned in the NETLink® PRO Compact. Moreover, data exchange via MPI/PB and/or RFC 1006, the '*Observe Variables*' action has the lowest priority. The update time in the Web interface therefore depends on the concurrent bus load.

8 RFC1006 Function (S7-TCP/IP)

As an additional option, the NETLink® PRO Compact can implement the RFC1006 protocol (also known as S7-TCP/IP or as ISO on top of TCP). RFC mode is always active and does not have to be specifically enabled. The NETLink® PRO Compact automatically goes "*online*" as soon as it detects an RFC frame.

Because many visualization system manufacturers have implemented this protocol to implement connections with CPs from Siemens (e.g. CP343 or CP443), NETLink® PRO Compact with RFC1006 is a low-cost alternative to communication with these visualization systems.



! *Please also observe the application-specific instructions in Troubleshooting and possibly in other relevant documentation*

The RFC1006 functionality of the NETLink® PRO Compact is also supported by S7-200 systems.

The following software packages with RFC1006 support have so far been tested in conjunction with the NETLink products:

- WinCC V6.0/V7.0 (Siemens AG)
- WinCC flexible 2005/2007/2008 (Siemens AG)
- ZenOn V6.2 (COPA-DATA)
- PROCON-Win V3.2 (GTI Control)
- S7-OPC Server, V3.1 and higher (Systeme Helmholz GmbH)
- AGLink V4.0 (DELTALOGIC Automatisierungstechnik GmbH)
- INAT-OPC-Server (INAT GmbH)
- WinCE 5.0 Terminal TP21AS (Sütron Electronic GmbH)
- KEPserverEx V4.0 (KEPware Inc.)
- InTouch V9.5 (Wonderware GmbH)

Systeme Helmholz GmbH provides additional documentation on the subject of SCADA, HMI, and OPC (example applications) (for information see 11.3).

9 Bus Parameters in Single Master Operation

If the NETLink® PRO Compact is connected to a bus system on which no other master is active, the NETLink® generates the token itself. In which case it is then usually also necessary to adapt the relevant bus parameters.

The bus address with which the NETLink® PRO Compact signs onto the bus is entered in field "*NETLink MPI/PB Address*".

The value for this address may be anywhere in the range 0 through 126. It is a precondition for this that the selected address is not larger than the HAS (highest station address) and is not already being used for another device on the bus.

9.1 Storing specified bus parameters

For bus profiles MPI and PPI, no other adaptations besides the baud rate are usually necessary. However, the DP setting must be configured carefully.

When parameterizing, please note that all parameters for PROFIBUS are interdependent. That is, if a parameter, e.g. the baud rate, is changed, all the other parameters usually also change.

For MPI, on the other hand, all parameters besides the baud rate are fixed. That is, if an MPI connection of increased from, say, from 187.5 Kbps to 12000 Kbps, all other parameters can/must remain unchanged.

The following parameters must be taken into account:

- Baud rate: The required baud rate is entered in Kbps. For example *'187.5'* or *'12000'*. The possible values are: 9.6; 19.2; 45.45; 93.75; 187.5; 500; 1500; 3000; 6000, and 12,000.
- HSA The highest station address is entered here. For MPI generally *'31'* and for PROFIBUS *'126.'* However, any values can be used that are not equal to the default values.
- TSlot_Init This value is always '415' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Ttr This value is always '9984' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Max. Tsdr This value is always '400' for MPI – whatever the baud rate. For PROFIBUS

the appropriate value should be read from the PROFIBUS project.

- Min. Tsdr — This value is always '20' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tset — This value is always '12' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tqui — This value is always '0' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Gap — This value is always '5' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Retry — This value is always '2' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.

Incorrect bus parameters can interfere with the bus considerably!

Please note that under unfavorable circumstances an incorrectly parameterized NETLink® PRO Compact can interfere with the bus to the extent that regular bus operation is no longer possible.

9.2 Addressing (rack/slot mode ON/OFF)

RFC1006 connections are virtual point-to-point links, that is, links from the PC to the programmable controller (possible branching within the programmable controller is handled by the CPU => Routing).

Because NETLink® PRO Compact is a point-to-multipoint communication adapter ('PC to NETLink® PRO Compact ' on the one hand and 'NETLink® PRO Compact to many bus stations' on the other hand), it was necessary to implement different addressing methods to permit all communication variations.

The addressing methods are *'Addressed Mode'* (see Section 9.2.1) and *'Rack/Slot Mode'* (see Section 9.2.2).

These two addressing methods, which are mutually exclusive, permit most types of communication that are also possible via the NETLink-S7-NET.

9.2.1 Addressed mode

If different CPUs are to be accessed on the same MPI/PROFIBUS via RFC1006, addressed mode is suitable.

If this mode is used, the following setting must be parameterized on the configuration page of the Web interface.

- *‚Rack/slot mode'* must be deactivated (OFF)
  ⇨ Addressed Mode is active

The destination address now has to be entered in the RFC1006 driver of the Windows application (e.g. WinCC, see Section 9.3.1) instead of the rack and slot.

Please note that the rack and slot together fill only one byte which is divided as follows:

- Rack fills the upper three bits
  (11100000_{bin} for Rack 7, Slot 0)
- Slot fills the lower five bits
  (00011111_{bin} for Rack 0, Slot 31)

If you now want to communicate with destination address 2, the following has to be entered:

Rack 0, Slot 2.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Rack 1, Slot 17.

Section 11.3.2 contains a table were you can read off already converted values for the rack and slot.

There are also parameterization tools that do not provide fields with names like rack and slot. These tools normally have a parameterization field with a name such as Remote TSAP that is usually two bytes long and in hex format. This field, in which only the lower byte is of interest, is parameterized as follows:

If you want to communicate with destination address 2, the following has to be entered:

Remote TSAP 0202_{hex}.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Remote TSAP 0231_{hex}.

Section 11.3.2 contains a table were you can read off already converted values for the Remote TSAP.

The formula *Rack * 32 + Slot = Address* can be used for simplicity.

9.2.2 Rack/slot mode

In rack/slot mode, it is possible to access specific modules of the automation system.

This is achieved by only communicating directly with one, pre-parameterized station. This station routes the data packets not intended for it to the required rack/slot and routes the response back to the NETLink® PRO Compact.

This makes it possible, for example, to communicate in S7-400 systems with more than one CPU on a rack (⇨Multicomputing) without having to attach further CPUs to the bus.

To use this functionality, it is necessary to parameterize the following on the configuration page of the Web interface:

- *‚Rack/slot mode'* must be enabled (ON)
- For *'Fix destination address for R/S mode'*, the address of the required communication partner must be entered.

No special aspects have to be observed in the visualization system. The settings for the rack and slot or remote TSAP must be made as the described for the specific visualization system.

Section 9.3.1 explains addressed mode using WinCC as an example.

9.3 Example of configuration for WinCC V7.0

The basic parameterization of RFC1006 connections in visualization systems is explained here using the example of the WinCC V7.0 tool from Siemens AG.

It is assumed you are familiar with the development environment of WinCC, so that only points relating specifically to the connection need to be mentioned.

Because it is the Windows RFC1006 driver that is parameterized, all elements you will see in the WinCC example can also be found in similar form on other visualization systems/OPC servers that support RFC1006.

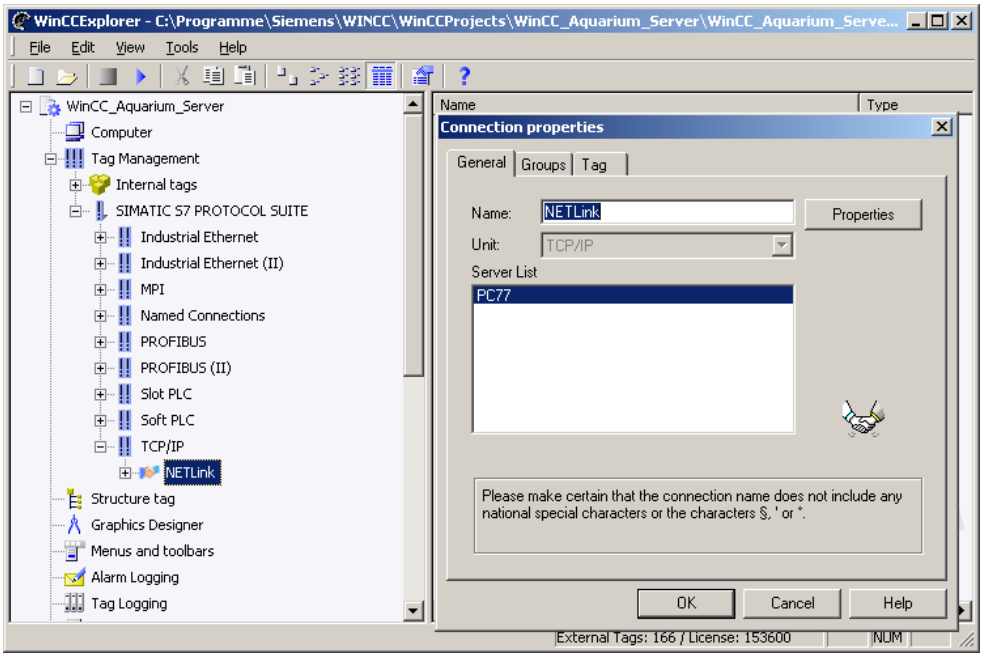
To explain the special aspects of communication with the NETLink® PRO Compact, the same connection is explained once for addressed mode (see Section 9.3.1) and again in rack/slot mode (see Section 9.3.2).

9.3.1 Using addressed mode

For the basics of addressed mode at the NETLink® PRO Compact end, see Section 9.2.1.

To parameterize a RFC1006 link in a WinCC project, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE.'*

Here, this connection is called *'NETLink.'*

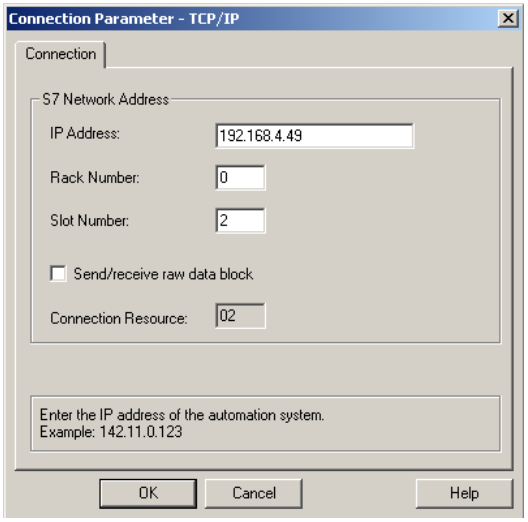


A click on '*Properties*' takes us to a setting form in which the IP address of the NETLink® PRO Compact and the rack/slot combination of the destination have to be entered.

The NETLink® PRO Compact has the IP address 192.168.4.49 on delivery

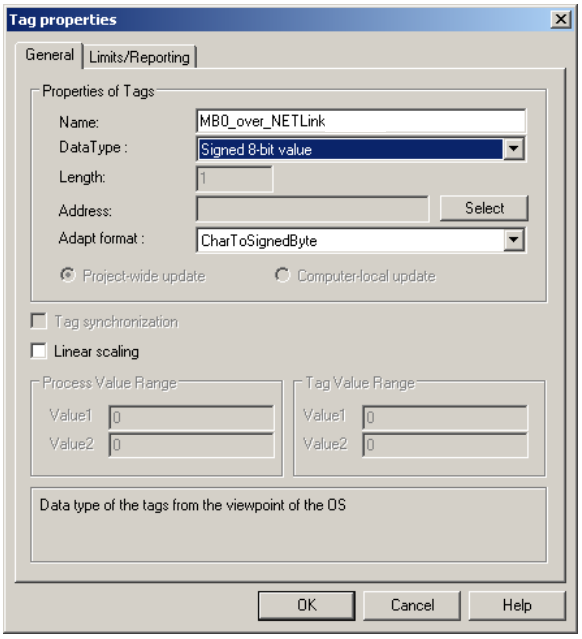
In this case, the NETLink® PRO Compact has the IP address 192.168.4.49.

The destination CPU with which we want to communicate has the PROFIBUS address 49. Because addressed mode is to be used, we can read off the correct value for the rack and slot from the table in Section 11.3.2.



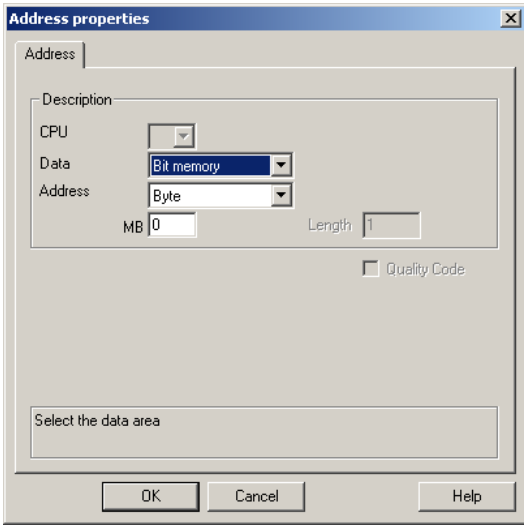
Under this connection we have just configured, we now have to create a variable.

This is done by right-clicking to open the context menu of the new connection and selecting *'New variable...'*.

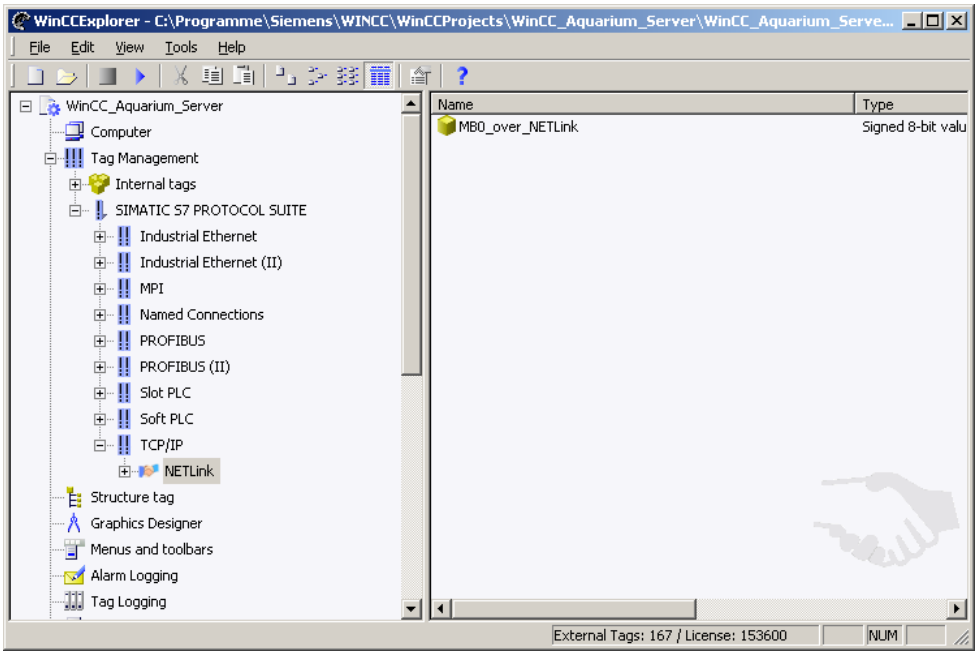


In the properties window of the variable, which was named *'MB0_over_NETLink'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink'* now exists under the *'NETLink'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via the NETLink® PRO Compact to read or write marker byte 0 from this address.

Further variables of different types can, of course, be created and used according to the same scheme.

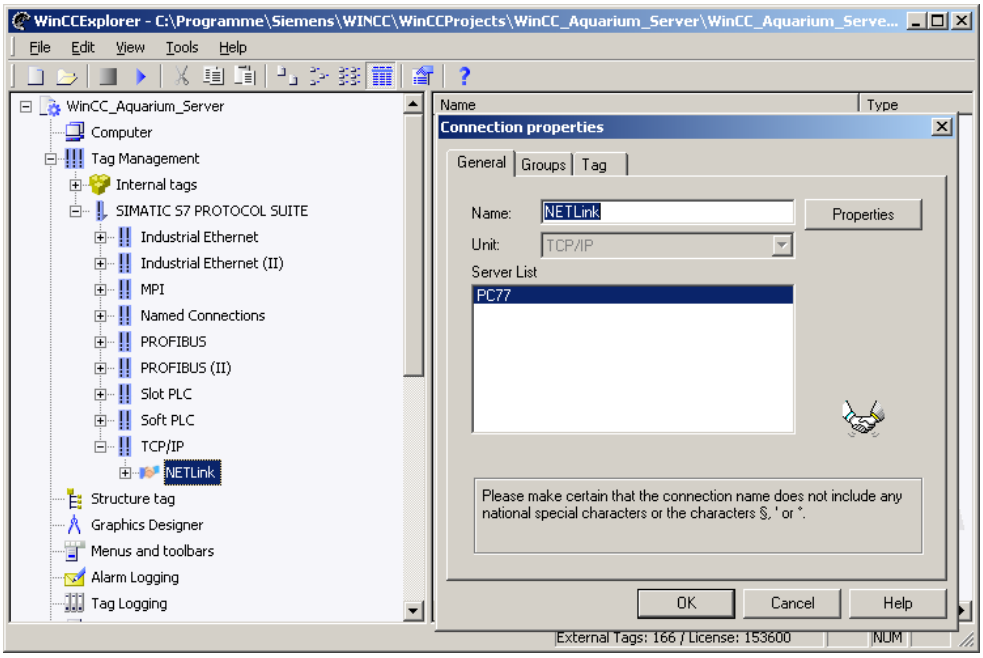
It is also possible to create additional TCP/IP connections in order to communicate not only with the CPU with bus address 49 but also with other CPUs.

9.3.2 Use of rack/slot mode

For the basics of rack/slot mode at the NETLink® PRO Compact end, see Section 9.2.2.

To parameterize a RFC1006 link in WinCC, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE.'*

Here, this connection is called *'NETLink.'*



A click on *'Properties'* takes us to a setting form in which the IP address of the NETLink® PRO Compact and the rack/slot combination of the destination have to be entered.

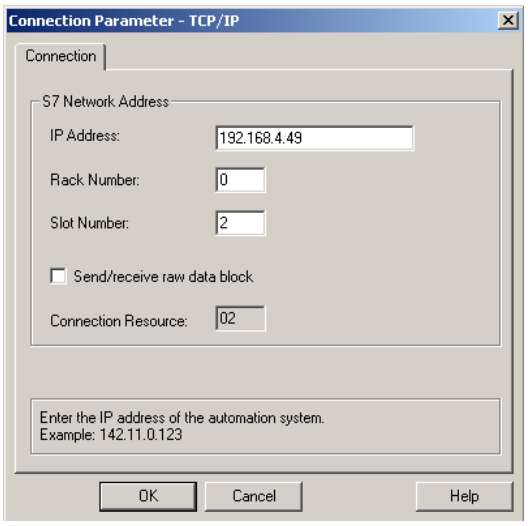
The NETLink® PRO Compact has the IP address 192.168.4.49 on delivery

In this case, the NETLink® PRO Compact has the IP address 192.168.4.49.

The destination CPU with which we want to communicate is in Rack 0 on Slot. Because rack/slot mode we are going to use, WinCC does not have to announce the CPU address. Instead, the real values for rack and slot are specified, in this case rack 0 and slot 2.

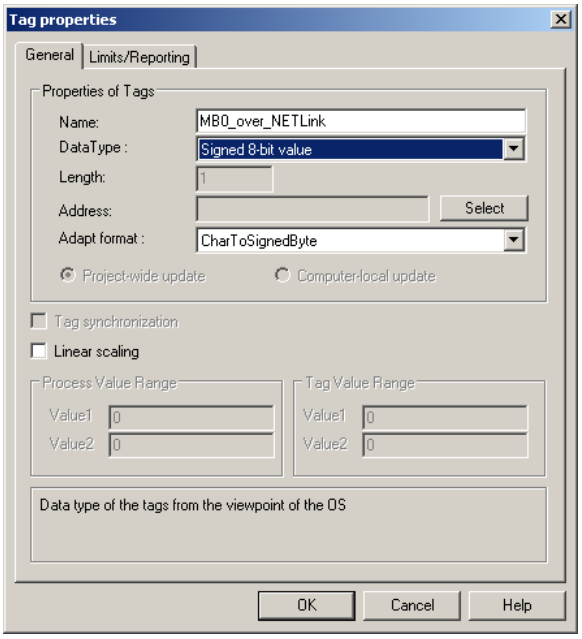
Remember to parameterize the NETLink® PRO Compact.

Please note that the destination address, 49 in this case, must now be announced to the NETLink® PRO Compact via the Web interface.



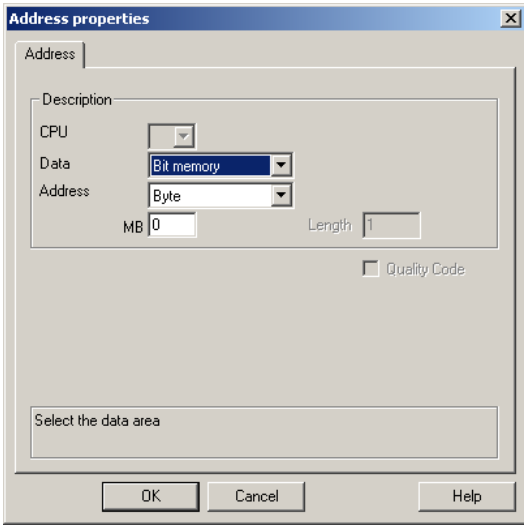
Under this connection we have just configured, we now have to create a variable.

This is done by right-clicking to open the context menu of the new connection and selecting *'New variable...'*.

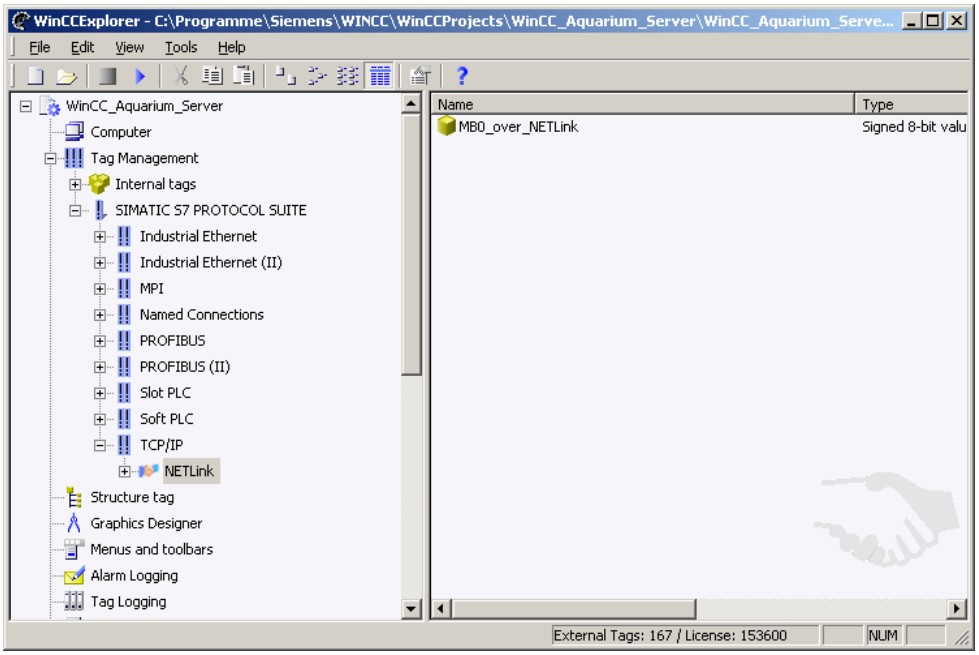


In the properties window of the variable, which was named *'MB0_over_NETLink'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink'* now exists under the *'NETLink'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via the NETLink® PRO Compact to read or write marker byte 0 from this rack 0, slot 2.

Further variables of different types can, of course, be created and used according to the same scheme.

It is also possible to create additional TCP/IP connections in order to communicate not only with rack 0 / slot 2, for example, but also with rack 0 / slot3. However, all the communication must go via bus address 49.

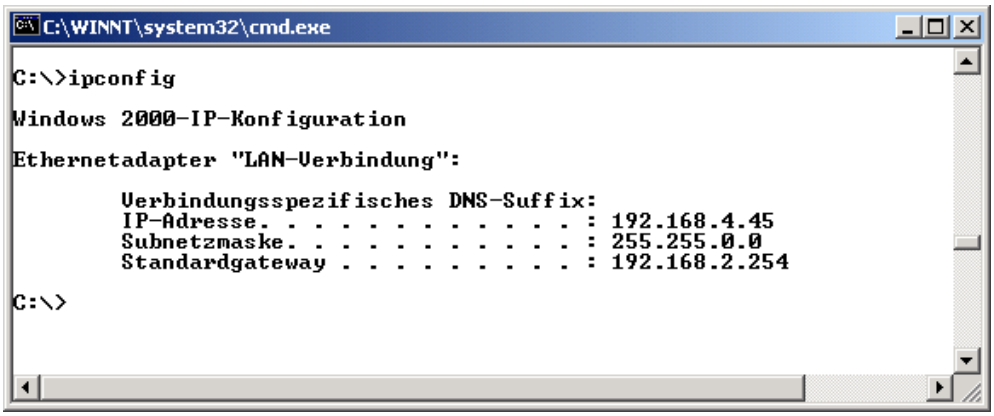
10 Troubleshooting

The points described here show some typical errors that can occur in day-to-day work with the NETLink® PRO Compact.

If any condition during operation is not described here and this manual does not provide any information on how to remedy it, the support of Systeme Helmholz GmbH is available to help you.

Q: I don't know the IP address of my computer.

A: Enter the command '*ipconfig*' after the prompt to show the configuration of the Ethernet interfaces of your computer.



Q: My computer has a firewall. Which ports must I release?

A: The NETLink-S7-NET driver communicates with the NETLink® PRO Compact via TCP port 7777.
UDP ports 25342 and 25343 are also used to search for the NETLink® PRO Compact devices.
Please release at least port 7777 so that the basic functionality of the driver is available.
If you use the RFC1006 functionality (also known as S7-TCP/IP), port 102 must also be released.
ATTENTION: If you want to use the driver option '*Internet teleservice*' (see Section 5.2.1), the specific ports configured there must also be released because this port will be used instead port 7777.

The default user name is "NETLink PRO Compact"

The default password is 'admin.'

Q: Both the configuration tool and the web interface ask me for a password and a user name. But I have never assigned a user name or password.

A: If no user name and/or password were/are specified, the default user name *'NETLink PRO Compact'* and the default password '*admin*' are applied.

Q: Once the configured PROFIBUS slaves have been added on my CPU, communication between NETLink® PRO Compact and STEP7 becomes markedly slower.

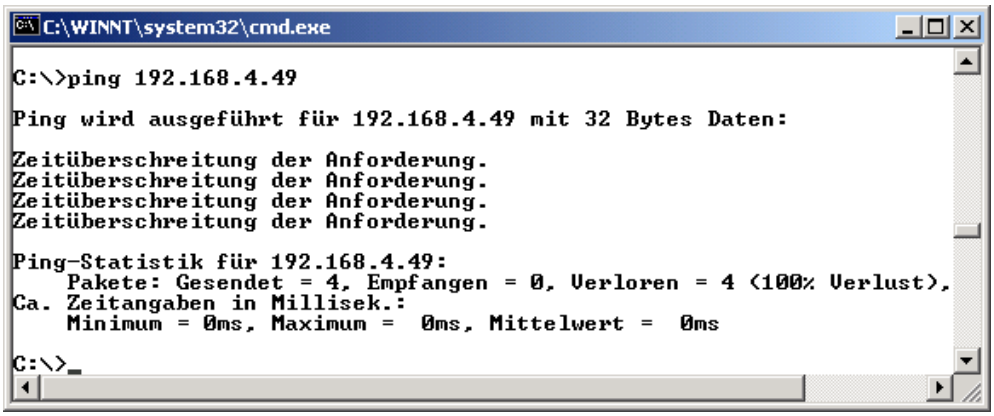
A: The user can influence the allocation of *'cycle load due to communication [%]'* under object properties of the CPU in the hardware configuration. The default value is 20 %.

Q: I get an error message when I access the controller.

The NETLink® has the IP address 192.168.4.49 on delivery from the factory.

A: The problem may be the setting of the PG/PC interface (e.g. PROFIBUS instead of MPI, address already allocated, etc.) or the NETLink® PRO Compact if it is not connected or not accessible at this IP address.

Make sure you have set the IP address correctly in the driver configuration. Please also enter the command *PING <IP address>* at the DOS prompt to check whether the NETLink® PRO Compact can also be accessed physically via the network.


C:\WINNT\system32\cmd.exe
C:\>ping 192.168.4.49
Ping wird ausgeführt für 192.168.4.49 mit 32 Bytes Daten:
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Ping-Statistik für 192.168.4.49:
Pakete: Gesendet = 4, Empfangen = 0, Verloren = 4 (100% Verlust),
Ca. Zeitangaben in Millisek.:
Minimum = 0ms, Maximum = 0ms, Mittelwert = 0ms
C:\>

Q: The setting dialog boxes are not appearing in the Simatic Manager:

A: Please note that after initial installation the NETLink-S7-NET driver must be added to the PG/PC interfaces.
Make sure you had administrator rights during installation. Reboot your PC after installation if prompted to do so.
You need at least version 5.1 of the Simatic Manager.

Q: The Starter program has problems accessing a Micromaster drive.

A: When you request a *'control priority'* for the Micromaster drive, please increase the Failure monitoring from 20ms to 200ms and the Application monitoring from 2000ms to 5000ms, so that the Starter software remains operable.

Q: Every time I execute a certain function, it fails and the red LED flashes.

A: An exception has occurred in communication. Please contact support and describe how the error can be triggered. The support team will attempt to solve the problem as quickly as possible.

Q: If I set the NETLink® PRO Compact to auto baud in the PG/PC interface and try to go online, the active LED lights up briefly before a message appears telling me that the bus parameters cannot be determined.

A: Either the CPU used does not support the cyclic transmission of bus parameters (disabled via parameterization or function does not exist), or the CPU is so busy with general communication tasks that the lower-priority bus parameter frame is transmitted too infrequently and cannot be detected by the NETLink® PRO Compact.
Please deactivate the auto baud functionality in the NETLink-S7-

NET driver (PG/PC interface) and set the correct baud rate and the correct profile.

Q: I use the rack/slot mode of the RFC1006 interface (rack/slot mode = ON) and have specified address 2 for my existing CPU in the Web interface in 'Fix destination address for R/S mode.' Although NETLink® PRO Compact online is active (active LED lights up), my visualization system tells me that no link can be established.

A: Make sure you have assigned the correct values to rack and slot in the parameterization. For example, to communicate with a CPU in a 300 rack, you must enter '0' for rack and '2' for slot. Many visualization system manufacturers have grouped together the two fields. In that case, there may be a field with the name 'Remote TSAP' containing a hex value such as '0102.' In this case, the hex value '02' stands for rack 0 and slot 2.

Q: I would like to use addressed mode of the RFC1006 interface (rack/slot mode = OFF) because that way I can access several CPUs on the same bus. Unfortunately I am not sure how to parameterize the fields rack and slot in the visualization used.

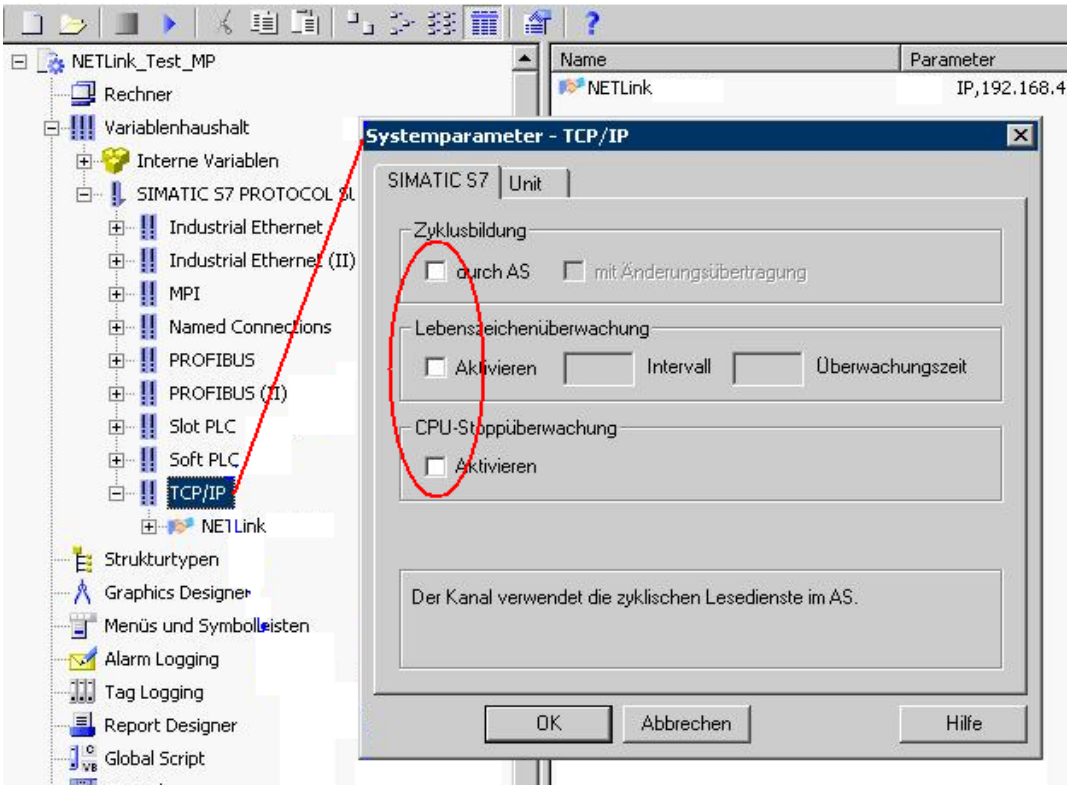
A: If addressed mode is used, a combination of rack and slot specifies the destination address of the automation system.
If the CPU is to be addressed with bus address 2, the value 0 for the rack and the value 2 for the slot must be entered.
Please note that the rack field consists of three bits and the slot field of five bits – i.e. together they comprise one byte and eight bits. That means, for example, the value 1 (00000001_{Bin}; 01_{Hex}) in the rack field must be entered for bus address 49 (00110001_{Bin}; 31_{Hex}) and the value 17 (00010001_{Bin}; 11_{Hex}) in slot field.
For parameterization tools that offer a field with a name like *'Remote TSAP'* for parameterization instead of separately parameterizable rack and slot fields, the value of the bus address can be entered directly without being taken apart and converted.
For example, for bus address 2, the hex value *'0102'* can be entered and for bus address 49 the hex value *'0131.'*
An address conversion table is given in Section 11.3.2 to simplify this task.

Q: If I mix RFC1006 connections and connections via the STEP7 driver, the link sometimes breaks off or error messages appear saying that it is not possible to establish a link.

A: For communication with S7-300 modules it may be necessary to parameterize the communication resources.
The user can influence the allocation of existing *'connection resources'* under object properties of the CPU in the hardware configuration.

Q: The variables from my S7 200 CPU are not updated in my WINCC project.

A: The default settings of the system parameters in register *SIMATIC S7* for *Cycle Formation, Sign-of-Life Monitoring* and *CPU-Stop Monitoring* must be deactivated.



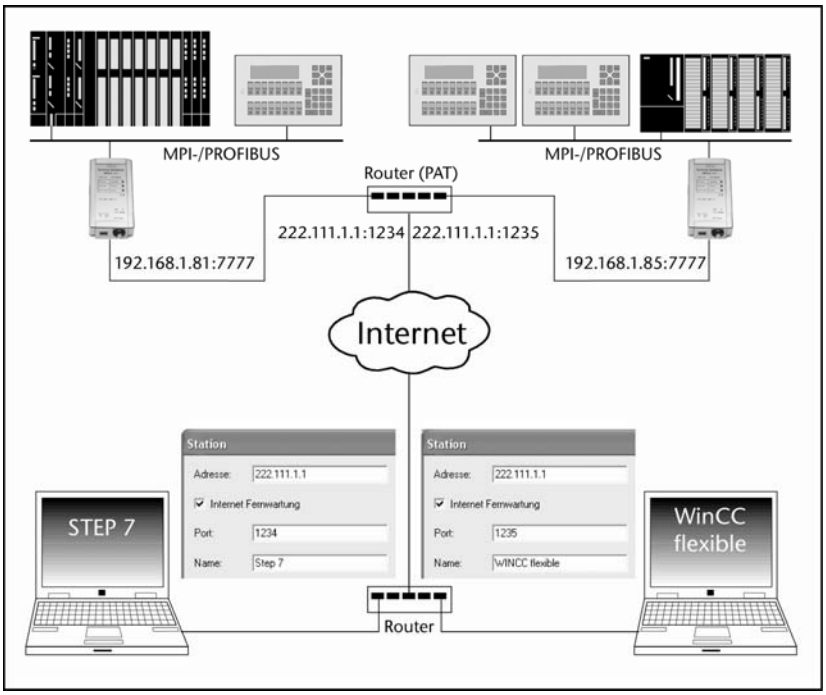
Q: When the adapter is plugged onto the PROFIBUS, no online connection is possible.

A: If possible, use the auto baud functionality.
If this is not possible or not desired, check the timing parameters for the PROFIBUS in the STEP7 configuration. Enter the read values into the advanced bus parameter settings via the '*Bus parameters'* button. If on-line access is still not possible, set a higher 'Ttr' both in the NETLink® PRO Compact and on the CPU.

Q: What should I look out for when implementing Internet teleservice via a router?

A: If the NETLink® PRO Compact devices are in a private network behind a router, they cannot be addressed by their private IP address on the fixed NETLink® PRO Compact port 7777 from the Internet.
To be able to address the devices from the Internet despite this, a 'public' port is configured in the router for each NETLink® PRO Compact.

After that, access is possible via the public IP address of the router and the configured port.



By default, the S7 network driver attempts to address the NETLink® PRO Compact via fixed port 7777, which would not work in the above scenario.

For that reason the "*Internet Teleservice*" option has been installed in the SHS7-NET driver, with which the port of a NETLink® PRO Compact configured in the router can be set.

This configuration can be made in the 'Station' dialog box.

There is a detailed description of the settings for a 'station' in Section 5.1.2.

For explanations, see the figure above:

Private NETLink® address → Public NETLink® address

NETLink 1: 192.168.1.81 Port 7777 → 222.111.1.1 Port 1234

NETLink 2: 192.168.1.82 Port 7777 → 222.111.1.1 Port 1235

Q: What must I observe when calling your technical support?

A: Please have all relevant data of your system constellation with the connected stations and program modules at hand when you contact technical support at Systeme Helmholz GmbH.

11 Appendix

11.1 Technical data

Dimensions in mm (LxWxH)	64 x40 x 17
Weight	Approx. 110 g
Operating voltage	24 V DC ±25 %
Current consumption	200 mA
Ethernet interface	10 Base-T / 100 Base-TX, Auto - (MDI)X
Ethernet connection	RJ45 socket
Ethernet transmission rate	10 Mbps and 100 Mbps
MPI/PROFIBUS interface	RS485, electrically isolated
MPI/PROFIBUS transmission rate	9.6 Kbps; 19.2 kbps 45.45 kbps 93.75 kbps 187.5 kbps 500 kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps
MPI/PROFIBUS connection	SUB-D connector, 9-way with programming unit interface
MPI/PROFIBUS protocols	FDL protocol for MPI and PROFIBUS
Displays	2 LEDs, including 1 three-color LED, for general status information
Degree of protection	IP 20
Ambient temperature	0 °C ... 60 °C
Storage and transportation temperature	-20 °C to +90 °C
Relative humidity during operation	5 % to 85 % at 30 °C (no condensation)
Relative humidity during storage	5 % to 93 % at 40 °C (no condensation)

11.2 Pin assignments

11.2.1 MPI/PROFIBUS interface pin assignments

Connector	Signal	Meaning
1	-	Unused
2	GND	Ground power supply (looped through)
3	RxD / TxD-P	Receive / transmit data-P
4	-	Unused
5	DGND	Ground for bus termination (looped through)
6	DVCC	5 V DC for bus termination (looped through)
7	VCC	24 V DC for power supply (looped through)
8	RxD / TxD-N	Receive / transmit data-N
9	-	Unused

11.2.2 Assignment of the Ethernet interface (host interface)

Connector	Signal	Meaning
1	TX+	transmit data
2	TX-	transmit data
3	RX+	receive data
4	-	Unused
5	-	Unused
6	RX-	receive data
7	-	Unused
8	-	Unused

The NETLink® PRO Compact comes with a shielded cross-over category 5 TCP cable with a length of three meters.

The maximum cable length between two TCP interfaces is 100 meters according to IEEE802.

If distances greater than 100 meters have to be covered, the use of switches or hubs is recommended.

11.2.3 Power supply socket

If an external power supply is used, please make sure the polarity is correct and all technical data are complied with.

11.3 Further documentation

In addition to this manual, the accompanying CD includes additional documentation and example projects for your free use. You will always find further information or new and revised versions at: www.helmholz.de.

Selection as of 03/2010:

- Extended NETLink functions - Project-specific interface
- Communication with OPC, SCADA, HMI - Application examples with RFC 1006
- NETLink WebService – Application examples and software

11.3.1 Information in the internet

http://www.helmholz.de

http://www.profibus.com

http://www.siemens.com

http://www.ietf.org/rfc

11.3.2 Address conversion table

The following table is a parameterization aid for fining the correct setting for rack/slot or for remote TSAP in addressed mode.

Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP
0	0	0	0200		32	1	0	0220		64	2	0	0240		96	3	0	0260
1	0	1	0201		33	1	1	0221		65	2	1	0241		97	3	1	0261
2	0	2	0202		34	1	2	0222		66	2	2	0242		98	3	2	0262
3	0	3	0203		35	1	3	0223		67	2	3	0243		99	3	3	0263
4	0	4	0204		36	1	4	0224		68	2	4	0244		100	3	4	0264
5	0	5	0205		37	1	5	0225		69	2	5	0245		101	3	5	0265
6	0	6	0206		38	1	6	0226		70	2	6	0246		102	3	6	0266
7	0	7	0207		39	1	7	0227		71	2	7	0247		103	3	7	0267
8	0	8	0208		40	1	8	0228		72	2	8	0248		104	3	8	0268
9	0	9	0209		41	1	9	0229		73	2	9	0249		105	3	9	0269
10	0	10	020A		42	1	10	022A		74	2	10	024A		106	3	10	026A
11	0	11	020B		43	1	11	022B		75	2	11	024B		107	3	11	026B
12	0	12	020C		44	1	12	022C		76	2	12	024C		108	3	12	026C
13	0	13	020D		45	1	13	022D		77	2	13	024D		109	3	13	026D
14	0	14	020E		46	1	14	022E		78	2	14	024E		110	3	14	026E
15	0	15	020F		47	1	15	022F		79	2	15	024F		111	3	15	026F
16	0	16	0210		48	1	16	0230		80	2	16	0250		112	3	16	0270
17	0	17	0211		49	1	17	0231		81	2	17	0251		113	3	17	0271
18	0	18	0212		50	1	18	0232		82	2	18	0252		114	3	18	0272
19	0	19	0213		51	1	19	0233		83	2	19	0253		115	3	19	0273
20	0	20	0214		52	1	20	0234		84	2	20	0254		116	3	20	0274
21	0	21	0215		53	1	21	0235		85	2	21	0255		117	3	21	0275
22	0	22	0216		54	1	22	0236		86	2	22	0256		118	3	22	0276
23	0	23	0217		55	1	23	0237		87	2	23	0257		119	3	23	0277
24	0	24	0218		56	1	24	0238		88	2	24	0258		120	3	24	0278
25	0	25	0219		57	1	25	0239		89	2	25	0259		121	3	25	0279
26	0	26	021A		58	1	26	023A		90	2	26	025A		122	3	26	027A
27	0	27	021B		59	1	27	023B		91	2	27	025B		123	3	27	027B
28	0	28	021C		60	1	28	023C		92	2	28	025C		124	3	28	027C
29	0	29	021D		61	1	29	023D		93	2	29	025D		125	3	29	027D
30	0	30	021E		62	1	30	023E		94	2	30	025E					
31	0	31	022F		63	1	31	023F		95	2	31	025F					

12 Glossary

These are explanations of the most important technical terms and abbreviations from the manual.

Advanced PPI	The extension of the PPI protocol of the S7-200 series, normally only compatible with CPUs of the S7-22x series and higher
ANP	See auto negotiation
ASCII	American Standard Code for Information Interchange describes a character set that includes the Latin alphabet in upper and lower case, the ten Arabic numerals, as well as some punctuation marks and control characters
Autobaud	Also called "auto sensing," is a function supporting automatic adjustment of the baud rates in a network
Auto negotiation	ANP describes a function that automatically recognizes and configures communication partners in the network
Baudrate	The speed set on a bus system
Bit	Binary digit describes the smallest digital information unit. Defines 0 or 1
Broadcast	Data packet transmitted to all stations in a network
Browser	Also known as Web browser, is a program for viewing Internet pages. In addition to addressing and referencing other positions in the text, a graphical user interface be displayed, for example Web interface.
Bus	Buses are connection systems for electronic components. For example, the MPI Bus is a connection medium for S7
Byte	A byte denotes a series of 8 bits that constitute a logical data entity
CAT5-TCP cable	Category 5 Ethernet cable that supports a data rate of 100 Mbps over a distance of 100 m
Client	A device that requests services. The requests are sent to a server, which returns the relevant answers to the client.
Computer	In this manual, this refers to the programmer (PG) or personal computer (PC).
DHCP	Dynamic Host Configuration Protocol, DHCP server can dynamically pass an -> IP address and other parameters to DHCP clients on request.
DNS	Domain Name System is a shared database system in LAN as well as in the internet that transforms IP addresses into plain text addresses
Domain name	The domain is the name of an Internet page. It consists of the name and an extension. The domain of Systeme Helmholz is: www.helmholz.de
Firewall	A service running on a server that blocks certain services/ports and prohibits unauthorized access
Flow Control:	A process that sends a break frame if the data buffer is almost full.
Gap	The Gap Update Factor specifies after how many token cycles the master checks whether an additional master is signaling its presence on the bus
Gateway	This is a machine that works like a router. Unlike a router , a gateway can also route data packets from different hardware networks.

HMI	Human-Machine Interface denotes the interface between the human operator and a system through which the operator can operate the system or intervene in the process
HSA	Highest station address that is polled
Hub	A mediation system between LAN segments. Unlike a switch, on a hub, all data arising in the Ethernet are applied to all ports
Interfaces	General definition of interfaces, such as a network interface card that constitutes an Ethernet interface
IP address	Internet protocol address. The IP is the address of a device in a network at which it can be reached. It consists of four bytes and is expressed in decimal notation. Example: 192.168.4.49
ISO on top of TCP	see RFC1006
LAN	Local area network, a network of computers that are relatively close to each other physically.
MAC address	The Media Access Control address is used only once for each single network component that is not changeable. It consists of 6 bytes and is written in hexadecimal notation. Example: 08-FF-FA-9C-ED-5A
Master	Is and active station that is permitted to transmit data to and request data from other stations, when it holds the token
MDI / MDI-X Auto Crossover	Makes it possible to identify if a cross over or a straight cable is connected and configures the port accordingly.
MLFB	16-digit Siemens identification number
MPI	Multipoint Interface. Interface that is used for S7-300 and S7-400 systems and that supports baud rates up to 1.5 Mbps
NAT	Network Address Translation is the collective term for procedures for replacing address information in data packets by other address information in an automated and transparent way. This is very useful when connecting private networks via a public line.
Net mask	See subnet mask
Network rules	Network rules determine how the different data packets are handled in a network device. For example, data packets are blocked or forwarded to or from certain network stations
OPC	Object Linking and Embedding for Process Control allows data transfer between applications of different producers, for example, using the RFC1006 protocol
PAT	Port address translation. Used when multiple private IP addresses of a LAN need to be translated into one public IP address
PG socket	The programming unit socket of the bus connector allows further bus nodes to be plugged in.
Port	These are address components that are used in network protocols to assign the correct protocols to data segments, also using port forwarding.
Port forwarding	The passing on of requests to ports via a network.

PPI	Point-to-point interface, interface with S7-200 systems with a maximum baud rate of 187.5 kbps
PROFIBUS	Process Field Bus is the protocol that is used mainly for automation, e.g. for the S7-300 and S7-400 systems with a maximum baud rate of 12 Mbps
Profinet	Standard for industrial Ethernet in automation.
Proxy	System for buffering. Requests can be answered faster via a proxy, and the network load can also be reduced. Mainly used to separate a local area network from the WWW.
Rack/Slot	Rack refers to the configured module rack (default: 0) and slot, to the slot for the module in question (default CPU: 2). The default configuration for an R/S is therefore 0/2
Retry limit	Bus parameter that determines the number of attempts will be made to call a DP slave
RFC1006	Request for comment is a type of protocol. It defines the way an ISO packet is transported in a TCP data packet as "*useful load*"
RJ45 socket	A network socket with 8 wires according to the RJ plug system
Router	This is a machine that ensures in a network that the data of a protocol arriving at it are forwarded to the intended destination network or subnet.
Routing	Routing means a defined function that mediates messages and data between LANs, WANs, MPI, and PROFIBUS
S7-TCP/IP	Interface parameterization in the PG/PC interface that is based on TCP/IP and that is handled via the selected network interface card of the PC
SCADA	Supervisory Control and Data Acquisition. Generic term for a type of process visualization that includes monitoring, control, and data acquisition of automation systems, etc.
Server	A device that provides special services at the request of clients.
Single master	Only one master is connected to the system. The NETLink® family members WLAN, Switch, and PRO Compact can also act as single masters
Slave	A station that is only permitted to exchange data with the master if requested to do so by the latter.
Socket	Data links that are created by means of ->TCP or ->UDP work with sockets for the addressing purposes. A socket consists of an IP address and a port (cf. address: street name and house number)
Subnet mask	Defines the network or host component of the IP address. It permits subdivision of address ranges and prevents direct access to other networks.
Switch	A device that can connect multiple machines with Ethernet. Unlike a hub, a switch is "*smart*" in that it can remember the MAC addresses that are connected to a port and routes the traffic more efficiently than the individual ports
TCP/IP	The Transmission Control Protocol is a transport protocol to permit data exchange between network devices. IP is the extension for Internet Protocol.
Timeout	Defines a protocol instruction that is activated if a defined time has been exceeded
Token	Is a frame for permission to transmit in a network. It is passed from master

	to master
Tqui	Transmitter fall time (bit) is the time that is needed to restore the quiescent signal level on the signal line after transmitting data
TSAP	Transport Service Access Point. The TSAP corresponds to the layer 4 address that has to match crossed-over for a station and the communication partner to be reached. The remote TSAP of Station1 is equivalent to the local TSAP of Station2. Entry of any characters, e.g. numerals is possible
Tsdr	Protocol processing time of the responding station (station delay responder)
Tset	The setup time (bit) is the time that is allowed to elapse between transmitting and receiving telegrams
Tslot_Init	The slot time (bit) is the maximum time that a transmitter waits for a station it has addressed to respond
Ttr	Target rotation time (Bit) is the reference token time. This means teh reference and actual token times are compared. This difference determines how much time is available to the master to transmit its own telegrams to the slaves
UDP	User Datagram Protocol, transport protocol permitting data exchange between network devices. It is a connectionless protocol, that is, data transmission is performed without error detection.
URL	"*Uniform Resource Locator*," denotes the address at which a service can be found in the Web browser. In this manual, the IP address of the NETLink® PRO Compact is usually entered as the URL.
VPN	Virtual Private Network. Logical links, called tunnels, are established iva existing unsecured networks. The end points of these links ("*tunnel ends*") and the devices behind them can be thought of as a separate, logical network. A very high level of security against tapping and tampering can be achieved if data transmission via tunnels is encrypted and the stations in this logical network first authenticate each other.
WAN	Wide Area Network, a network of computers that are physically far apart. The internet is the largest known WAN
Web interface	Is opened using a browser. It contains the data and functions to be able, for example, to interact with the NETLink® PRO Compact.
WWW	World Wide Web. Worldwide communication network, also known as the Internet.